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Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

NOTE:—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

Reprints of the review article entitled "Antibacterial Agents derived from Micro-Organisms" may be obtained from: Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth. Price 1/- each.

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DISEASES CAUSED BY BACTERIA AND FUNGI

SEELEMANN, M. (1941). Ueber den gegenwärtigen Stand der Galtbekämpfung. **[The Present Position of Mastitis Control].**—*Tierärztl. Rdsch.* **47.** 90–92.

This is a general discussion on the control of streptococcal mastitis, special emphasis being laid on the importance of hygienic measures and the necessity for the proper co-operation of all farm personnel.

Infection is independent of age or milk yield, but is influenced by the type of milking, *viz*, wet or dry hand-milking or machine milking, and by whether carried out indoors or outside, as well as by the general health of the herd. Where certain conditions such as foot and mouth disease are endemic, it is said that cases of mastitis are more frequent than in other herds owing to lowering of the resistance of the herd as a whole.

S. considers that udder infusion with entozon or trypaflavine has so far proved to be the best method of treatment.—N. S. BARRON.

PALMER, C. C., KAKAVAS, J. C., & HAY, J. R. (1940). **Correlation of the Brom-Thymol-Blue Test with the Bacteriological Findings in the Diagnosis of Mastitis.**—*J. Amer. vet. med. Ass.* **96.** 47–51.

Comparative examinations were made of the milk from the quarters of 48 animals on three farms, all of which were affected with clinical or subclinical mastitis. The presence on the blood plates of organisms of mastitis significance was the standard for a positive reading. 8% of the quarters examined were bromthymol positive and bacteriologically negative. 29% were bromthymol negative and bacteriologically positive. 40% were bromthymol positive and bacteriologically positive. 22% were bromthymol negative and bacteriologically negative. These contradictory results were not explained on the basis of a single type of bacterial infection, but were found to be distributed throughout the several types of infection.—R. FISHER.

MCKENZIE, D. A. (1941). **The Use of Thallium Acetate Glucose Broth in the Diagnosis of Streptococcal Mastitis.**—*Vet. Rec.* **53.** 473–480.

A simple and apparently reliable method of examining milk samples for the presence of *Str. agalactiae* is to inoculate a small amount of gravity cream into 0·5% glucose broth containing 0·1% thallium acetate (which was found to inhibit the growth of most organisms other than some types of streptococci) and 0·00005% crystal violet (which tends to reduce the number of false positives due to commensal udder micrococci which may grow in the presence of thallium acetate), and to incubate for 48 hr. at 37°C. Microscopic examination is made of the sediment from those tubes that show a heavy flocculent deposit (the supernatent fluid being clear, turbid, or more often showing small granular masses of growth in suspension), as typical long-chain streptococci occur only in such a deposit. A small portion of the deposit is further inoculated in poured blood-agar plates, and examined after 24 hours at 37°C.

—E. COTCHIN.

SLANETZ, L. W., & JAWETZ, E. (1941). **Isolation and Characteristics of Bacteriophages for Staphylococci of Bovine Mastitis.**—*J. Bact.* **41.** 447–455.

Staphylococcal bacteriophages, isolated from the milk of seven out of 20 cows excreting

staphylococci in the milk, showed characteristics similar in many respects to those of staphylococcal phages of human origin. Like the human phages, they were, with one possible exception, single type polyvalent phages producing small sharp-edged circular plaques, although some strains differed in plaque size and heat stability. Cross-lytic tests demonstrated that the staphylococci pathogenic to human beings and animals were very closely related, since they could not be distinguished by selective phage action. Susceptibility to lysis by phage could not be correlated with biochemical or toxigenic properties. The effect of phage therapy was studied in six kittens and three rabbits with experimental staphylococcal infection. A discussion of the part played by phage in resistance to bovine staphylococcal mastitis followed.

—R. O. MUIR.

KRIISA, A. (1939). Coli-mastiidid ja nende ravi, eriti kaltsiumkloriidi ja coliseerumiga. **[Bovine Coliform Mastitis and its Treatment with Antiserum and Calcium Chloride].**—*Eesti loomaastl. Ring.* **15.** 261–276. [Abst. from German summary].

During a ten-year period, 217 (30%) of 723 cases of mastitis treated at the veterinary institute of Tartu university were of the coliform type, which is characterized by sudden onset and serum-like udder secretion; paresis often occurs also. 118 cases were treated by intravenous injections of $CaCl_2+MgCl_2$ and by antiserum, in addition to local treatment. Fifty-two cows recovered rapidly and completely within the lactation period in which treatment was given, 52 showed some improvement, but a few "lost a quarter" and the rest died or failed to recover to an economic level. Only five of 12 cases with paresis recovered.

HUANG, C. H., & SIA, R. H. P. (1940). **Experimental Streptococcal Infections in Animals for Therapeutic Investigations. I. Virulence-tests.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 87–90.

A comparison was made of the lethal effects of *Str. haemolyticus* for small laboratory animals when the organisms were introduced intraperitoneally, interpleurally, intravenously, and intracerebrally. Experiments on hamsters and white mice showed that these animals were suitable for testing the virulence of *Str. haemolyticus* when injected by the intracerebral route; 40–400 organisms killed the animal when given intracerebrally, but it required 400,000 when given interpleurally and 4,000,000–11,500,000 when given intraperitoneally or intravenously.—R. ALLCROFT.

VERWEY, W. F., & FROBISHER, M., Jr. (1940). **The Electrophoresis of Staphylococci. I. A Consideration of some of the Factors Affecting Electrophoretic Velocity. II. A Correlation between Electrophoretic Velocity and Certain Biological Characteristics of Staphylococci.**—*Amer. J. Hyg.* Sect. B. **32.** 55–62 and 63–68.

I. Electrophoretic studies by the microscopic method on a large number of strains of staphylococci show that the mobilities of individual cells from a strain are satisfactorily uniform and only slightly affected by storage. The effect of heating on the mobility depends on the strain, some strains remaining unchanged whilst others alter in mobility.

Investigation of the pH-mobility relationship shows that most strains are always negatively charged; some acquire a positive charge below pH 2.

II. The electrophoretic examination of 84 strains of staphylococci under standardized conditions ($M/75$ phosphate buffer pH 7·4), reveals that the mobilities form a continuous series.

Strains having a lower mobility were those which chiefly produced coagulase and toxin, and were isolated from pathological conditions. Strains from the higher mobility region of the series tended to be non-producers of coagulase and toxin and were isolated from non-pathological conditions.

The demarcation between the two groups was fairly sharp at a mobility of 41×10^{-5} cm./sec./volt./cm.—R. A. KEKWICK.

NUMHEIMER, T. D., & FABIAN, F. W. (1940). **Influence of Organic Acids, Sugars, and Sodium Chloride upon Strains of Food Poisoning Staphylococci.**—*Amer. J. publ. Hlth.* **30.** 1041–1049.

With further recognition of the part played by staphylococci in food poisoning, a study was made of the resistance of typical strains to some of the chemical agents found in food, such as organic acids, sugars, and NaCl. Nine strains of staphylococci isolated from actual cases of food poisoning and one of the non-pathogenic

strains, *Staph. albus*, were examined for identification of food-poisoning strains by the technique of CHAPMAN, BERENS, NILSON & CINCIO (1934), and of these, five strains were selected for the ensuing experiments, with the non-pathogenic *Staph. albus*.

Known numbers of the organisms were grown on 1% dextrose broth to which were added various amounts of 0·1 N strength of the following acids, acetic, citric, lactic, malic, tartaric, and hydrochloric and the amounts necessary to exert inhibiting and germicidal effects for each strain were determined. The pH values at these concentrations were determined electrometrically. The acids having the highest dissociation constants showed the weakest germicidal effects, the order being acetic > lactic > citric > malic > tartaric > hydrochloric. The action of the observed effects was found to be due to factors in addition to the pH, possibly the unionized molecule, the anion, or both. The antiseptic effects were in a similar order except that the positions of citric and lactic acids were reversed.

NaCl in concentrations of 15–20% exerted an inhibiting effect and a 20–25% solution was definitely germicidal. The figures for dextrose were 30–40% for inhibitory, and 40–60% for germicidal effects. The corresponding figures for sucrose were 50–60% and 60–70%, sucrose being less active than dextrose or NaCl.

There was a great difference in the action of dextrose and sucrose upon the bacteria. Vigorous growth occurred within the first 24 hours even in concentrations of 70% sucrose. This phase was followed by four days in which the number of viable organisms remained comparatively constant; on the fifth day the number of organisms declined and by the seventh day all the organisms were dead. With dextrose the germicidal action was immediately apparent and uniform throughout.

When the sugars were mixed with acid, dextrose was found to be more effective than sucrose in lower concentrations of acid, although neither of the sugars was as efficient as NaCl in acid. The amount of dextrose which was required to exert a germicidal action could be reduced by 50% when used in the presence of one-half the inhibiting concentration of acid, but with NaCl and sucrose the reduction was only 30 and 20% respectively to be able still to bring about a germicidal effect.

—ALFRED EDEN.

URBAIN, A. (1940). Réceptivité de certains carnivores à la bactéridie charbonneuse. **[The Susceptibility of Carnivores to** *Bacillus anthracis*].—*C. R. Soc. Biol. Paris.* **134.** 8–10.

U. reports cases of fatal anthrax in carnivores fed on infected sheep's flesh at zoological collections in Paris, namely in ferrets, badgers, polecats, a marten, raccoons, an ocelot, two lynx, a serval, an ermine, a coati, and a mink.

It was noticed that foxes and jackals which also ate infected flesh remained well, so a few experiments were carried out. Three foxes and two jackals were given the carcasses of many g. pigs and rabbits dead of anthrax: they resisted infection, but a badger and a raccoon similarly fed died of anthrax. *B. anthracis* was also given to foxes and jackals by subcutaneous, intradermal, or intratesticular inoculation of 0·1–0·25 c.c. of culture. The jackals resisted completely, but foxes succumbed to the two latter methods of infection.—J. E.

TODOROV, A. (1939). **A New Anthrax Vaccine.**—*Vet. Sbir.* **43.** 8–17. [In Bulgarian: abst from French summary].

T. describes the method of preparing an anthrax spore vaccine for intradermal injection and of its titration on laboratory animals. Tests on 230 sheep and on a few domestic animals of other species demonstrated its innocuity.

PAGNINI, U. (1939). Contributo alla disinfezione delle mani inquinate di spore carbonchiose. **[Disinfection of Hands Infected with Anthrax Spores].**—*Clin. vet., Milano.* **62.** 327–342 and 391–415.

P. reviews previous attempts to destroy anthrax spores with disinfectants and describes his own experiments in which spore material was submitted to the action of disinfectants for various periods of time, the disinfectant neutralized, and the viability of the spores investigated by cultural and biological methods.

Hydrogen peroxide, hydrogen peroxide plus acetic acid, formalin (*ad* 10%), iodized alcohol, and trichloride of iodine were all too slow in their germicidal action to prove useful for the disinfection of the hands.

A number of experiments was then carried out with hydrogen peroxide plus formic acid. Hydrogen peroxide (12 vol.) plus 5% formic acid, or hydrogen peroxide (20 vol.) plus 3% formic acid was lethal to anthrax spores in 6–10 min. The mixture did not have any harmful effect on the skin.—MILLER WATSON.

FELDMAN, W. H., & MOSES, H. E. (1941). **The Demonstration of Tubercle Bacilli from Tissues of Cattle Tested with Avian and with Mammalian Tuberculosis.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 109–118.

This is a preliminary report upon an investigation into the problem of the " no-lesion " tuberculin reactor in herds of cattle in the U.S.A. A total of 1,595 cattle in 49 herds were tested simultaneously with both avian and mammalian tuberculins injected intradermally in the caudal fold. Fifty-one cattle gave positive reactions to the test and these animals were slaughtered, tuberculous lesions being observed in 53% of the carcasses. No lesions of TB. could be found in 15 animals and the so-called " skin lesions " were observed in the remaining nine cattle. G. pig inoculation and cultural examination were made from selected tissues from each animal. Bovine type tubercle bacilli were isolated from 16 cattle, all of which had shown tuberculous lesions on P.M. examination; the avian type was not isolated, although the infection was found to be present on 15 out of the 49 premises. Tubercle bacilli were not isolated from the nine " skin-lesion " reactors. Eight cattle which reacted to tuberculin were found to be infected with actinomycosis or actinobacillosis on P.M. examination. The authors stress the importance of the possibility of sensitization to tuberculin being caused by factors other than infection with tubercle bacilli.—E. C. HULSE.

WYSSMANN, E. (1941). Tuberkulose der Vulva und Vagina beim Kalb. **[TB. of the Vulva and Vagina of a Calf].**—*Schweiz. Arch. Tierheilk.* **83.** 74–81.

This is a record of a case of TB. of the vulva and vagina in a seven-month-old calf. There was marked swelling of the vulva and the vagina was thickened and showed numerous small ulcers. The histological diagnosis was "chronic inflammation" and TB. was apparently not diagnosed from sections. W. states, however, that " tubercle bacilli " were found in one of 17 smears. The uterus contained greenish pus and the regional lymph nodes were enlarged and caseous, but there is no mention of the presence of tubercle bacilli in these sites.

The pathogenesis of the condition is discussed.—E. G. WHITE.

NIEBERLE, K. (1941). Behring und der heutige Stand der Tuberkulosefrage. **[von Behring and the Modern TB. Situation].**—*Dtsch. tierärztl. Wschr.* **49.** 69–72.

This is an address given in honour of VON BEHRING at Marburg in December, 1940. N. discussed the varied tissue reaction of domestic animals to infection with the tubercle bacillus and dealt with the pathogenesis of the disease. This part of the address contains nothing new.

The methods used in various countries to control bovine TB. are discussed and the results obtained in Germany from the application of OSTERTAG's method are reviewed. In spite of the widespread bacteriological examination of samples of tracheal secretion, it has not been possible to reduce the incidence of TB. in infected herds. The probable explanation of this failure is that chronic TB. of localized organs—lungs, udder, uterus—is often the result of endogenous reinfection, and is not always exogenous.

Infection of calves in herds in which milk used for calf feeding is boiled before use is caused in almost 50% of cases by intra-uterine spread from tuberculous lesions in the placenta. The incidence of TB. in calves is 0·5–1%.

In cattle the most important age is 6–18 months and the route of infection in more than 90% of cases is by inhalation. Recent statistics of the results of tuberculin testing 412,000 cattle showed 31% to be reactors.

N. states that Ostertag's method of control cannot succeed and that, if the incidence of bovine TB. is to be reduced (it has risen considerably during recent years), it is necessary to establish TB.-free herds and to aim ultimately at the complete eradication of the disease. In heavily infected herds of large size it will be necessary to adopt Bang's method of segregating reactors and non-reactors.

—E. G. WHITE.

OPPERMANN, M. (1941). Ueber 64 Fälle von Tuberkulose beim Pferde. **[Sixty-Four Cases of Equine TB.].**—*Dtsch. tierärztl. Wschr.* **49.** 19–22, 37–40 and 100.

During the years 1932–1940, 64 cases of TB. in horses were encountered at the Hanover veterinary school clinic. This article describes in considerable detail the clinical history, diagnostic procedure, and PM. findings and the results are given in numerous tables. The incidence of TB. was 1·5% in horses examined at the clinic. The highest incidence was in

animals of 5–8 years. The disease was commoner in draught horses (38 cases) than in thoroughbreds (18 cases), and it is suggested that the reason for this may be the greater frequency with which foals of the former breeds are given large quantities of cow's milk with a consequently increased danger of infection. The remaining eight cases were in cross-bred animals.

Each animal was subjected to the tuberculin test. The intradermal test gave 81·6% of positive reactions and the other types of test were used only when the intradermal test was doubtful or negative. A positive reaction to the intradermal test usually took the form of a roughly circular raised area, 6–8 cm. in diameter, which was hot and painful. The lymph vessels became visible as cords, about the thickness of a pencil, passing down the neck for 20–25 cm. In some animals the reaction took the form of a much more extensive plaque-like swelling which was extremely painful on palpation and measured up to 20 cm. wide and 50 cm. long. In positive cases there were always severe general symptoms which were more marked in draught horses. A negative reaction might show a circumscribed swelling which did not exceed 5 cm. in diameter, was not painful, and had disappeared within 24 hours. Such cases never showed swelling of the neighbouring lymphatics and general symptoms were absent.

The complement-fixation test gave positive results in nine out of 17 tuberculous animals.

Demonstration of tubercle bacilli during life was possible in only one animal—in histological sections of a skin lesion. In cases with clinical symptoms of pulmonary TB. it was not possible to demonstrate the organism in the tracheal secretion.

Palpation of the enlarged mesenteric lymph nodes was often possible and they were differentiated from a verminous aneurysm by the differential leucocyte count. Rectal palpation of the posterior edge of the spleen was always possible, but in very big animals it was sometimes necessary to produce distention of the stomach in order to bring the spleen within reach.

The blood picture was examined in considerable detail and the findings were in all cases abnormal. It seems that most of the animals were affected with equine infectious anaemia as well as TB. and it is suggested that infection with this virus was probably primary and may have lowered the animal's resistance to spread of the secondary tuberculous infection.

A correction is made to one of the tables.

—E. G. WHITE.

WITTE, J. (1940). Tuberculose beim Rotwild in freier Wildbahn. [**TB. in Wild Red Deer**].—*Berl. Münch. tierärztl. Wschr.* July 19th. 349–350.

TB. appears to be rare in wild deer in Europe, although it is more common in herds kept in parks and more confined spaces. W. describes the examination of portions of the carcass of a female deer which were sent to him. A peculiar feature was the presence of pus foci in the subcutaneous tissues which had led to a preliminary diagnosis of a pyogenic infection. Further examination showed an encapsulated, caseous nodule in a portion of the lung and a thinly encapsulated focus of reddish-grey pus in a mediastinal lymph node. Another pus focus the size of a child's fist was found in the subcutaneous tissue of the thorax. Numerous acid-fast bacilli were observed and cultures of bovine type tubercle bacilli were isolated on glycerin-free Petragnani medium. Two g. pigs and a rabbit were inoculated with the culture subcutaneously and lesions typical of those caused by the bovine type tubercle bacillus developed in these animals in 4–5 weeks.

—E. C. HULSE.

*ÖHNELL, R. F. (1940). Om obduktionsmittofaran (spec. TBC) och dess förhindrande samt några ord om inkubationstiden vid aerogen medsmitting med bovin TBC. [**On the Danger and Prevention of Infection Especially TB.) during Necropsies, and a Few Words on the Incubation Period in Aerogenous Infection with Bovine Tubercle Bacilli**].—*Nord. Med.* **6.** No. 23. 1045. [Abst. in *Tubercle, Lond.* **21.** 366, copied *verbatim*].

A record of a case of bovine pulmonary tuberculosis and erythema nodosum in a veterinary student, who was probably infected during a post-mortem examination. The incubation period was about a fortnight.

VOLTERRANI, A. (1940). Sulla frequenza del b. tubercolare di tipo bovino nella tbc umana polmonare e extrapolmonare. [**On the Frequency of the Tubercle**

Bacillus of the Bovine Type in Pulmonary and Extra-Pulmonary TB. in Man]. —*Riv. Pat. Clin. Tuberc.* **14.** 137–147. [Abst. in *Tubercle, Lond.* **21.** 338, copied *verbatim*].

Volterrani examined the sputum of 56 cases of pulmonary tuberculosis and 39 cases of extrapulmonary tuberculosis (34 of osteo-articular lesions, two of adenitis, and one each of renal disease, testicular disease, and peritonitis) for bacilli of the bovine type with the following results. In three cases of extrapulmonary tuberculosis (one of tuberculosis of the knee and two of the lumbar vertebrae) bovine tubercle bacilli were found, while in two cases of pulmonary and two of extrapulmonary disease (sterno-costal and malleolar disease) cerophilous bacilli were present, which were moderately virulent for rabbits and occupied an intermediate position between the bovine and human types.

COLWELL, C. A., & MILLS, M. A. (1940). **Experimental Tuberculosis in the Dog. I. Cutaneous Sensitivity to Tuberculin in the Dog. II. Comparison of Old Tuberculin and Purified Protein Derivative in Intracutaneous Tests.**—*Amer. Rev. Tuberc.* **42.** 259–270 and 271–276.

I. Normal dogs do not respond to intracutaneous injections of 0·1 ml. of 1 : 100 O.T., but the same amount at a dilution of 1 : 10 causes atypical inflammatory reactions. Dogs experimentally infected with the tubercle bacillus gave positive reactions in a high percentage of cases at dilutions of 1 : 100 O.T., or of 0·01 mg. P.P.D., and even dilutions of 1 : 10,000 (0·01 mg. O.T. and 0·0001 mg. P.P.D.) gave two-plus reactions although 1 : 100,000 gave negative results. Of 46 dogs with primary inoculations of virulent tubercle bacilli 41 gave one-plus to four-plus reactions at 1 : 100 O.T., while five were negative. Ten of these dogs were reinfected and all gave two-plus to four-plus reactions.

Skin sensitivity developed in 7–12 days after intratracheal injection of 0·05–0·06 mg. per kg. body weight of virulent bacilli and in 16–21 days after intravenous injection of 0·4–0·6 mg. of BCG per kg. Sensitivity was more intense after administration of virulent bacilli than after corresponding or greater doses of BCG, and reinfection of dogs with primary lesions, or infection of BCG-inoculated animals with virulent bacilli, usually raised skin reactivity. Severity of reaction remained fairly constant as long as the general condition was good, but impairment of health reduced sensitivity.

II. Simultaneous intracutaneous tests with equivalent dilutions of O.T. (Parke Davis) and P.P.D. (Seibert) on 39 dogs with primary infections with virulent human or bovine tubercle bacilli, ten dogs with primary lesions reinfected with virulent bacilli, 13 dogs inoculated with BCG, and ten BCG-inoculated dogs injected with virulent bacilli, showed close agreement between the two types of tuberculin in respect of grade of reaction and number of positives. Advanced TB. and poor general health due to mange or distemper suppressed skin reactions both to P.P.D. and to O.T. The P.P.D. tuberculin is preferred for routine testing on grounds of superior purity and greater certainty of standardization.—H. H. G.

VAN DEINSE, F., FETHKE, N., & SOLOMIDÈS, J. (1940). Recherches sur l'urémie chez le lapin au cours de la toxi-infection tuberculeuse du type yersin. [**Uraemia in the Rabbit during Infection with Yersin Type TB.**].—*C. R. Soc. Biol. Paris.* **134.** 30–32.

Using Ambard's hypobromite micro-method, the authors determined that the normal urea content of the blood of rabbits is 0·2–0·6 g. per litre of serum. They applied the test to rabbits injected with avian or with bovine type tubercle bacilli causing a toxi-infection of the Yersin type. Uraemia was more intense (from 1–2 g. per litre) in rabbits with the avian type of infection than in those with the bovine type of infection (0·8–1·2 g. per litre). The authors are experimenting on this test as a method of differentiation between the two types of infection.—J. E.

VAN DEINSE, F. (1939). Arthrites tuberculeuses chez les lapins préparés au moyen d'injections de bacilles tuberculeux aviaires morts, et éprouvés par une inoculation intraveineuse de bacilles aviaires vivants. [**Tuberculous Arthritis in Rabbits Injected with Dead Avian Tubercle Bacilli and Tested by the Intravenous Injection of Living Avian Bacilli**]. —*Rev. Tuberc., Paris.* **5.** 232–235.

Twenty-six rabbits, vaccinated by 1-3 intravenous injections of dead avian tubercle bacilli, were injected intravenously with 0·1 mg. of live bacilli after an interval of 5–206 days. As

the interval between vaccination and test injection lengthened, the rapidly fatal Yersin type of toxic infection at first produced was replaced by a prolonged chronic infection characterized by scattered nodular lesions and in certain cases by an arthritis of the terminal joints of the limbs. The author considered that the production of these chronic lesions with cachexia demonstrated the relative avirulence of avian tubercle bacilli for desensitized rabbits.—R. O. MUIR.

PECK, R. L., & ANDERSON, R. J. (1941). **The Chemistry of the Lipids of Tubercle Bacilli. LXIV. Concerning Phleimycolic Acid.**—*J. biol. Chem.* **140.** 89–96. [For part LXIII, see *V. B.* **11.** 832].

A dibasic acid of approximate formula $C_{70}H_{138}O_6$ is the principal ether-soluble constituent of the wax of the Timothy grass bacillus. This acid, tentatively designated as phleimycolic acid, is probably a mixture of acids at present unseparated, and in properties resembles the mycolic acids prepared from other acid-fast bacteria.

The dimethyl ester of this acid subjected to pyrolysis at 250–280°C. under 2 mm. pressure decomposes into a volatile methyl ester of a tetracosanoic acid and a non-volatile residue. Saponification of the ester gave a tetracosanoic acid $C_{24}H_{48}O_2$, m.p. 75·76°C. This acid crystallizes in compact fern-like forms and there is evidence to suggest that it possesses a Mansted chain structure. The non-volatile residue comprised the methyl ester of at least two different acids which differed in composition and properties. Values obtained for the molecular weight, iodine number, and hydroxyl value do not agree with any rational formulae.
—ALFRED EDEN.

WOOLLEY, D. W., & MCCARTER, J. R. (1940). **Antihemorrhagic Compounds as Growth Factors for the Johne's Bacillus.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 357–360.

Details are given of the concentration of an active growth factor for Johne's bacillus from *Mycobacterium phlei* by extraction with boiling water or boiling acetone. It was also shown that phthiocol, vitamin K, and 2-methyl naphthoquinone (all anti-haemorrhagic compounds) were effective in promoting the growth of the Johne's bacillus although growth was better when filtrates of *Mycobact. phlei* were added to the synthetic basal medium, indicating that something in addition to the anti-haemorrhagic factors was concerned. These results indicate that the fat-soluble vitamins also play a role in the metabolism of certain bacteria.—R. ALLCROFT.

JESPERSEN, K. W. (1938). Syrefastheden af de i Svinets Halskirtler optraedende Corynebakterier. [**Acid-Fastness of Corynebacteria occurring in the Cervical Lymph Nodes of Swine**].—*Medlemsbl. danske Dyrlaegeforen.* **22.** 128–136.

J. has found, from a study of numerous cases of *Corynebact. equi* infection of the cervical lymph nodes of swine, that the organism is acid-fast in smears stained by Ziehl-Neelsen's method modified by the replacement of methylene blue as a counterstain by 1% malachite green. The organism in culture of a few days was also acid-fast to this method. It also proved to be very resistant to sulphuric acid [see also *V. B.* **11.** 77 and **12.** 5].—J. E.

LIND, H. (1939). Corynebacterium equi infektsioonist varssadel. [*Corynebact. equi* **Infection of Foals**].—*Eesti loomaarstl. Ring.* **15.** 49–57. [Abst. from German summary].

During 1938 several cases of disease and death in foals in a village near Tartu occurred. The lungs were principally involved. Two sick foals sent for examination were found to be affected with a catarrho-purulent pneumonia, with degenerative changes in the heart and parenchymatous organs. From pus a Gram-positive cocco-bacillus was isolated and identified (for the first time in Estonia) as *Corynebact. equi.*

EVERTS, G. S. (1941). **The Occurrence of Swine Erysipelas in the Human Family.**—*J. Amer. vet. med. Ass.* **98.** 213–216.

Swine erysipelas infection in man is known as erysipeloid. The commonest form which it takes is comparable with the urticarial or diamond skin disease of swine. The acute septicaemic and the chronic forms are rare.

Infection is invariably associated with skin wound infection particularly of the hands, and it is most common in those handling pork products or salt water fish. Although S.E. infection of fish is unknown in the U.S.A., the organism is commonly present as a saprophyte in the slime on the fish, probably originating from sewage. E. refers to one observer's having noted over 1,000 cases in commercial

fishermen. The disease has also been observed in bone-button factory workers, retail butchers, pleasure fishermen, bakers handling lard, and veterinary students engaged in dissecting a horse.

Following an incubation period of 24–76 hours, pain, a characteristic purplish erythema, and swelling develop at the site of inoculation. The erythema usually spreads by continuity, but sometimes purplish patches develop several inches away from area of infection. Lymphangitis, adenitis of regional lymph nodes, and sometimes stiffness of an involved finger follow. In most cases recovery takes place in three weeks but no immunity results.

E. states that it is difficult to evaluate the different methods of treatment which are employed as in many cases the disease runs a self-limited course and immobilization of the hand may be the only treatment required.

—GWILYM O. DAVIES.

HALL, E. B. D. (1937). **Some Clinical Phases of a Disease Strongly Resembling Septicaemia Haemorrhagica Occurring in this Country.**—*Vet. Rec.* **49.** 1382–1383.

H. describes the symptoms and P.M. lesions of a disease in cattle, the incidence of which appears to be increasing. A peracute form is described in which the animal is found dead and the lesions are those usually associated with an acute septicaemia. A less acute form is also mentioned, together with other forms in which oedematous swellings occur in the upper part of the neck or skin lesions are present about the axillae and lower part of the chest. Cases showing bronchitis, interstitial pneumonia, and intestinal symptoms are also referred to.

Apart from stating that bipolar organisms have been demonstrated in several blood samples, H. mentions nothing more regarding the actiology of the condition.—G. O. DAVIES.

GATTI, A. (1939). Sulla recettività di alcune specie di volatili all'infezione sperimentale da B. Bubalisepticus. [**The Susceptibility of Some Species of Birds to Experimental Infection by** *Pasteurella bubaliseptica*].—*Profilassi.* **12.** 146–148. [French and German summaries].

One loopful of heart blood from a rabbit which had succumbed to artificial infection with *Past. bubaliseptica* was injected subcutaneously into one greenfinch, two sparrows, and one goldfinch; all the birds died within 24 hours.

Two goslings were inoculated and died. A duck and a turtle-dove resisted infection.

G. concludes that greenfinches, sparrows, and goldfinches are suitable for diagnostic work.

—MILLER WATSON.

*SCHENK, H. (1938). Pasteurellen in den Luftwegen von Katzen als Ursache von Wundinfektionen beim Menschen nach Katzenbiss. [**Pasteurella in the Air Passages of Cats as a Cause of Wound Infection in Human Beings after Cat Bites**].—*Inaug. Diss., Munich.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Oct. 13th. 620. (1939)].

Following the observation of KREMSREITER [*V. B.* **10.** 579.] on a case of human disease caused by a cat bite, S. examined 20 dead cats and isolated a pasteurella organism from each of 15 of them. The same organism was also isolated from cat-bite wounds of four persons. The characters of the pasteurella are described.

BOISVERT, P. L., & FOUSEK, M. D. (1941). **Human Infection with Pasteurella lepiseptica Following a Rabbit Bite.**—*J. Amer. med. Ass.* **116.** 1902–1903.

A laboratory animal attendant was bitten at the base of a finger by a rabbit affected with snuffles. The wound became inflamed and was cleaned and cauterized, after which the hand and forearm developed acute cellulitis, which declined under local treatment and terminated by abscessation of the hand. From the pus and from the nose of the rabbit a pasteurella was isolated. It caused rapid death of mice inoculated intraperitoneally and was judged to be *Past. lepiseptica.*—J. E.

BASS, A., BERKMAN, S., SAUNDERS, F., & KOSER, S. A. (1941). **Growth Factors for Hemophilus influenzae and Hemophilus parainfluenzae.**—*J. infect. Dis.* **68.** 175–183.

Previous studies on the cultivation of *H. influenzae* have shown that the X factor can be replaced by haemin and the V factor by cozymase or coenzyme II. A third factor present in veal-infusion broth, the nature of which is as yet unknown, is also required. It cannot be replaced by pantothenic acid, cocarboxylase, riboflavin, ascorbic acid, vitamin B_6, or inositol.

SNYDER & BROH-KAHN (1938) reported that cysteine is as effective as haemin in place of the X factor, but the authors were not able to confirm this observation. They found, however, that highly purified catalase preparations from horse or ox liver were as effective as haemin and were also capable of replacing coenzymes, thus apparently supplying a substance functioning as V factor.—R. E. GLOVER.

KÕIVASTIK, T., & LIND, H. (1939). Salmonella grupi pisikute esinemisest koduloomaden Eestis. **[Animal Salmonella Infection in Estonia].**—*Eesti loomaarstl. Ring.* **15.** 43–49. [Abst. from German summary].

The authors examined for the presence of salmonella all pathological material sent for diagnosis to the State serum institute, Tartu, in 1937 and 1938. Salmonella organisms were detected in 39 out of 2,528 samples. *S. enteritidis* was detected eight times, *S. enteritidis* var. *dublin* 13 times, *S. enteritidis* var. *rostock* once, *S. typhi-murium* ten times, *S. cholerae-suis* var. *kunzendorf* four times, *S. pullorum* twice, and *S. abortus-equi* once.

The distribution of these cases in the various species of animals (ox, horse, pig, fowl, and silver fox) is described.

OLSON, Å. (1938). Bidrag till kännedom om paratyfos förorsakad av Salmonella enteritidis var. Dublin hos nötkreatur. [*S. enteritidis* **var.** *dublin* **Infection in Cattle**].—*Svensk VetTidskr.* **44.** 93–110.

A review of the literature and a record of several cases of *S. enteritidis* var. *dublin* infection causing diarrhoea, abortion, and death in cows and death in foetuses and young calves. In one case the infection was also found in the ovary of a hen kept in the byre.

There is a discussion on this disease in cattle in Sweden and on serological diagnosis and epidemiology.—J. E.

HUDDLESON, I. F. (1940). **Studies in Brucella Infections.**—*Rep. Div. vet. Sci. Mich. St. Coll. 1939–40.* pp. 41–46.

Studies in brucella infections undertaken or continued during the year include the following.

The leucocyte picture in human brucellosis was studied by MUNGER. In persons infected with *Br. melitensis*, the blood showed leucopenia with relative lymphocytosis and slight monocytosis. In 40% of cases there were "pathologic lymphocytes" and "liver endothelial cells," while basophilic granulation of the neutrophiles occurred in all cases.

MUNGER also made a study of the toxic effect of a fraction from brucella cells on the haemopoietic system of g. pigs. This revealed a reduction of 70% in the peripheral leucocyte count with a predominant loss of neutrophiles taking place in 15–30 min. after subcutaneous injection of a sublethal or lethal dose of the fraction. This could not be accounted for by their migration to blood vessels of other tissues of the body. There was evidence of destruction of leucocytes in the peripheral blood (disintegration of neutrophiles and increase of uric acid in the urine). No noticeable reduction of leucocytes occurred in whole citrated blood from normal g. pigs when it was mixed with varying amounts of toxic fraction and incubated at 37°C. As it was not possible to show any *in vitro* action of the fraction in whole blood, it is believed that its *in vivo* destructive effect on neutrophiles is due to the formation of lytic substance from the action of the toxic fraction on some tissue of the body.

S cultures of three species of brucella were found to have a definite capsule which can be demonstrated by the following technique. An air-dried smear is made from a dilute suspension of brucella cells; over this is smeared a drop of Keuffel and Esser drawing ink no. 3000 which is allowed to dry and then treated with methyl alcohol containing 0·1% glacial acetic acid, dried and stained with aniline crystal violet (diluted 1 : 1 with distilled water) for 5 min., washed with distilled water and air dried. The soma appears as a deep purple coccus or rod inside the capsular material, when examined with a high power ocular under an oil immersion objective.

STAHL studied the chemical composition of the lipids of an S strain of *Br. abortus*. Lipids make up 5–6% of the dried weight of the cells. Alcohol-ether soluble lipids were separated into 27% acetone-soluble fat and 73% phosphatide. The latter gave on hydrolysis fatty acids, glycerophosphoric acid, and ethanolamine. The acetone-soluble fat gave on saponification glycerol and fatty acids. An unidentified crystalline compound containing C, H, and S was isolated from the chloroform-soluble fraction. Examination for "bound lipids" only yielded a small amount of a simple glyceride.

Serological and allergic cross-reactions be-

tween *Bacterium tularense* and brucella were studied by PENNELL. Protein nucleate solutions were prepared from the three species of brucella and from a non-virulent strain of *Bact. tularense* for measuring cross-precipitin, agglutinin, and allergic reactions. *Bact. tularense* rabbit antiserum precipitated homologous protein nucleate solution in 1 : 32,000 dilution, but the heterologous solutions in only 1 : 4,000 dilution. Antisera for *Br. melitensis* and *Br. suis* precipitated homologous protein nucleate in 1 : 64,000 and the heterologous solution in 1 : 32,000 dilution. *Br. abortus* antiserum precipitated homologous solution in 1 : 64,000 and the heterologous solution in 1 : 4,000 dilution. Only a slight cross-agglutination reaction occurred between the two antigens and their antisera. There was no cross-allergic reaction in sensitized rabbits between brucella and *Bact. tularense*.

The work of PENNELL and STAHL showed that the following conditions must be maintained for the precipitation of the maximum amount of brucella precipitin antibody nitrogen. For goat or cow antiserum and endo-antigen, 37°C. for two hours, overnight at 4°C. For purified and unpurified cow antiserum and glucolipid antigen, 4°C. for 48 hours. Conditions to be maintained for determining the maximum amount of brucella agglutinin antibody nitrogen are, for goat or cow antiserum and homologous cells, 4°C. for 48 hours. PENNELL found that the urine of some human brucellosis patients contains brucella-precipitating antibody.

HUDDLESON, HAMANN, and STAHL made experiments on the immunizing value of antigenic fractions obtained from brucella cells. The g. pig was the preliminary test animal. No protection was obtained with the protein nucleate, the endo-antigen, or the glucolipid fractions. A crude extract from crushed brucella cells centrifuged until free from live bacteria and cell sediment was given intradermally in doses of 0·95 and 1·9 mg. at intervals of three days to 10 g. pigs. Another ten g. pigs received 0·38, 0·38, and 0·95 mg. at intervals of three days. After 30 days these g. pigs and ten controls each received subcutaneously 258 live, virulent *Br. abortus* organisms. After four weeks, P.M. examination showed completely negative results in the g. pigs treated, while among the controls, six were found to be infected. No difficulty is anticipated in the immunization of large animals by this means. In tests of para-, ortho-, and meta-nitrobenzoic acid in the treatment of g. pigs infected with *Br. abortus*, the drug was found by HAMANN to have no therapeutic value.

—J. A. GRIFFITHS.

MÕTTUS, A. (1939). Brutselloosi likvideerimise tulemusi ja taudiseis 15. IX 1939. a. **[Control of Bovine Brucellosis in Estonia: Position in September, 1939]**.—*Eesti loomaarstl. Ring.* **15.** 169–175. [Abst. from German summary].

A campaign against bovine brucellosis was started in 1932 and infected herds were identified and placed under veterinary control, affected animals being ear-marked. By an order of 1936 the veterinary authorities were empowered to have infected cattle slaughtered. Compensation was paid.

Up to 1939, 159 infected herds had been registered, and infection had been eliminated from 93 herds, leaving 44 infected herds with 1,114 reactors. 1,023 infected animals had been slaughtered.

For diagnosis the agglutination test was always used, and the complement-fixation test was used occasionally. Aborted foetuses were bacteriologically examined.

A four-year control plan had been started.

HOFSTAD, M. S. (1941). **The Changes Produced by Brucella Abortus in the Milk and Udder of Cows Infected with Bang's Disease.**—*Thesis, Cornell.* pp. 46.

H. found that when *Br. abortus* is eliminated from the udder in large numbers there are changes in the milk as determined by the cell count, the chloride or bromthymol-blue tests, or by any combination of these three. The cell count of strippings usually gives more significant results than the cell count of the foremilk. Gross physical changes as determined by strip-cup examination were observed in the milk from one quarter of a cow artificially infected with *Br. abortus* by intravenous injection. No gross changes were found in naturally infected animals. Pathological changes were studied in one udder naturally infected with *Br. abortus* and free of other pathogens. The predominating lesion consisted of infiltration of mononuclear leucocytes confined primarily to areas in the interstitial tissue.—H. L. G.

WITTE, J. (1941). Ueber das Vorkommen von Bangschen Abortus-Bakterien beim Wild

in freier Wildbahn. [**The Occurrence of *Brucella abortus* in Wild Animals**].—*Berl. Münch. tierärztl. Wschr.* March 14th. 128–131.

Records of the discovery of *Br. abortus* in wild animals are rare, though the organism has been reported in a number of animals including two bison, a number of deer, and wild hares. Information of this kind may be of value in connexion with the epizoology of the disease both in man and animals.

W. describes the cultural and serological characteristics and the pathological effects of an organism which he isolated from a wild hare. On P.M. examination, blood splashings were found under the peritoneum in the region of the psoas muscles, and subcutaneous purulent foci, varying from the size of a pea to that of a hazel nut, were present over the sternum and ribs. The contents were yellowish-grey and odourless. No organisms were visible in stained smears, but *Br. abortus* was obtained in culture.—N. S. BARRON.

*PATELLI, E., & BENDINELLI, C. (1938). Rapporti fra brucellosi bovina e brucellosi umana nelle provincie di Pisa e di Lucca. [**Bovine and Human Brucellosis in the Provinces of Pisa and Lucca, Italy**].—*Igiene mod.* **31.** 119–128.

Serological tests indicated that 6·7 per 10,000 inhabitants of the province of Pisa and 29·5 per 10,000 of the province of Lucca were infected by brucella. In Pisa 207 head of adult cattle were tested and 51% reacted to the agglutination test; in Lucca 222 animals were tested and 66% were found to be infected. Of 119 calves tested, 34 reacted positively.

SCHELLNER, H. (1940). Ueber die aktive Immunisierung der Pferde gegen Tetanus mit Alaunformoltoxoid. [**Active Anti-Tetanic Immunization of Horses with Alum-Formol Toxoid**].—*Z. Veterinärk.* **52.** 1–5.

From experiments on 16 horses, it seemed that an active immunity against tetanus, produced by two subcutaneous inoculations at four weeks' interval, each of 10 ml. of alum-formol toxoid (Behring), lasted for at least 20 months. —E. COTCHIN.

BAUMANN, R. (1940). Gibt es eine durch Staphylokokken hervorgerufene Aktinomykose? II. Mitteilung. [**Actinomycosis caused by Staphylococci. II.**] —*Wien. tierärztl. Mschr.* **27.** 250–251. [For part I, see *V. B.* **9.** 814].

Dealing with the question of whether so-called actinomycosis of the udder may be caused exclusively by staphylococci, or whether the latter, recovered from such cases, are really contaminants in an original actinomycotic process, B. carried out *in vitro* tests to find whether staphylococci were able to invade and dissolve cultures of, or tissues infected with, an actinomyces organism [here named *Corynebacterium Israeli*] and *Actinobacillus lignieresi*.

When added to established broth cultures of these organisms, *Staph. aureus* proved to have no antagonistic effect at all. Again, blocks of true actinomycotic tissue were sterilized and placed in broth, which was inoculated with *Staph. aureus* recovered from a case of mastitis in a bitch. It failed to invade the blocks of tissue.

B. regards these results as evidence for the existence of a true staphylococcal infection causing actinomycosis-like lesions.—J. E.

FANELL, E., LORDI, G. H., & VOGEL, J. (1939). **Haverhill Fever. Report of a Case with a Review of the Literature.**—*Arch. intern. Med.* **64.** 1–14.

ALLBRITTEN, F. F., SHEELY, R. F., & JEFFERS, W. A. (1940). **Haverhillia Multiformis Septicaemia, its Etiologic and Clinical Relationship to Haverhill and Rat Bite Fevers.**—*J. Amer. med. Ass.* **114.** 2360–2363.

In the first paper there is a description of a human case of rat-bite fever in the U.S.A. due to *Haverhillia multiformis* [*Actinomyces muris*] infection, with a discussion of the literature of the diseases due respectively to this organism and to *Spirillum minus*. The authors of both papers emphasize the importance of recognizing that *A. muris* and *S. minus*, the former a parasite of rats and the latter of rats and mice, are each capable of causing disease in man, the term "rat-bite fever" thus covering two distinct diseases. They say "it is unfortunate that three American medical textbooks published in 1937 and 1938 compare the bacteriologic entity of *Spirillum minus* infection with infection due to *Haverhillia multiformis*."

A. muris infection can be caused by the bite of an infected rodent or by the ingestion of raw infected milk.

The second paper, besides giving a general discussion of the nature of these two infections deals with human cases that occurred in the U.S.A.

WRAMBY, G. (1940). Actinobacillos hos får. [**Actinobacillosis in Sheep**].—*Skand. VetTidskr.* **30.** 1228–1242. [English summary].

W. describes a case of actinobacillosis causing abscessation of the lips, cheeks, and associated lymph nodes in sheep. Microscopic examination of the lesions showed a club-rosette, Gram-negative organism and cultural tests identified it as *Actinobacillus lignieresi.* It was pathogenic for mice and g. pigs and it agglutinated a known strain of *A. lignieresi.*

A comparison is made of this disease and one described by CHRISTIANSEN (1917), MAGNUSSON (1929), JOWETT (1931), and THORSHAUG (1934). The first wrote about a "pyaemia in sheep" and stated the causal organism to be *Bacterium purifaciens* n.sp., the later authors following this lead. W., however, claims that it is really an actinobacillosis identical with the disease which he describes, and he supports this opinion with a table [extract given below] showing the fermentation reactions of both organisms; they are practically identical and the very few differences are not regarded as significant.

	arabinose	rhamnose	xylose	dextrose	fructose	galactose	mannose	lactose	maltose	saccharose	trehalose	raffinose	sol. starch	dextrin	glycogen	inulin	glycerin	adonite	dulcite	mannite	sorbite	inosite	salicin	amygdalin	arbutin
Actinobacillus lignieresi																									
1–7 day culture ...	—	—	+	+	+	+	+	—	+	+	—	—	+	+	—	—	—	—	—	+	—	—	—	—	—
8–14 day culture ...	—	—	+	+	+	+	+	+	+	+	—	—	+	+	—	—	+	—	—	+	—	—	—	—	—
Bact. purifaciens ... Christiansen	—	—	+	+	+	+	+	—	+	+	—	+		—		—	+	—	—	+	—	—	—	—	—
Bact. purifaciens ... Magnusson	—	—	+	+	+	+	+	+	+	+		—	—			—	—	—	—	+	—	—	—		

—J. E.

MADSEN, D. E. (1941). **A Study of Some Pathogenic Fungi Isolated From Animals.**—*Thesis, Cornell.* pp. 65.

A study of the morphology, growth characteristics, and pathogenicity of three pathogenic fungi, *viz*, *Cryptococcus rotundatus* recovered from a cow, *Actinomyces canis* from a dog, and *Zymonema dermatitidis* also of canine origin. The *Cryptococcus* was relatively non-pathogenic for mice, rats, g. pigs, and rabbits. No lesions of consequence developed in the dog and cat. Sheep and chickens were refractory. The *Actinomyces* was pathogenic for rats, mice, g. pigs, dogs, and cats. In sheep it produced only a localized abscess. Rabbits and chickens were refractory. Lesions consisted of granulomas with various degrees of necrosis and suppuration. The *Zymonema* was of low virulence for most experimental animals. In the testes of rats and g. pigs it produced necrosis and fibroblastic changes. The cat showed appreciable granulomas. The rabbit gave indefinite results. The dog, sheep, and chicken were refractory. All three organisms grew on the chorio-allantoic membrane of the chicken embryo, producing inflammatory foci and death of the embryo.—H. L. GILMAN.

WYSSMAN, E. (1941). Ueber Aspergillosen beim Rind. [**Aspergillosis in Cattle**].—*Schweiz. Arch. Tierheilk.* **83.** 166–171.

An acute case of aspergillosis in a three-year-old cow is described. The earliest symptoms were considered to indicate traumatic pericarditis, but the animal was killed within a few days as the condition got worse. P.M. examination showed multiple abscesses in the lungs and liver due to *A. fumigatus.*—E. COTCHIN.

KRAMER, S. P. (1939). **The Filterability of Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 448–451.

It is demonstrated that the retention of bacteria by siliceous filters (Berkefeld N) is adversely affected by the addition of surface-

active materials to the suspension medium. Bacteria previously retained by the filter pass through easily when such materials as sodium taurocholate, lecithin, soap, and sodium lauryl sulphate are added to the medium.

Any treatment of nutrient broth, for example, during sterilization, likely to cause the liberation of free fatty acid should on this account be avoided if reliable sterilization by filtration is required. A theory of the mechanism involved is suggested.—R. A. KEKWICK.

SAUNDERS, F., DORFMAN, A., & KOSER, S. A. (1941). **The Role of Nicotinamide and Related Compounds in the Metabolism of Certain Bacteria.**—*J. biol. Chem.* **138.** 69–82.

The respiration of dysentery bacilli growing on a nicotinamide-deficient medium with glucose as substrate was studied by the Warburg technique. This respiration was stimulated by the addition of di- and tri- phosphopyridine nucleotide, nicotinamide, nicotinic acid and other derivatives, and methyl nicotinate. The stimulation by the coenzymes was not as great as that produced by an equivalent quantity of nicotinamide, but was increased by the use of autoclaved coenzymes, and the activity then became essentially equal to their nicotinamide content. Methyl nicotinate was slightly more active and nicotinic acid less active than the amide, but the activity of nicotinic acid increased during the course of the experiment, suggesting a possible synthesis of the amide from the acid.

Similar results were obtained with *Proteus vulgaris* on a medium deficient in nicotinamide, using glucose as substrate, but, with the substitution of lactate for glucose, only diphosphopyridine nucleotide supported respiration. This organism also behaved similarly towards glutamate, but was unable to oxidize glucose monophosphate in the presence of nicotinamide or any of its derivatives, whereas for the dysentery bacillus it was found that all nicotinic acid derivatives which stimulated oxidation of glucose also stimulated the oxidation of glucose monophosphate and glutamate.

The present evidence is incompatible with the view that nicotinamide serves simply as a building block of either di- or tri- phosphopyridine nucleotide or both, and the effects observed are not adequately explainable as due to differences in diffusion rates.—A. EDEN.

EPSTEIN, L. A., & CHAIN, E. (1940). **Some Observations on the Preparation and Properties of the Substrate of Lysozyme.**—*Brit. J. exp. Path.* **21.** 339–355.

Lysozyme is a substance found in egg-white and in numerous animal organs and secretions as well as in plants and capable in minute amounts of dissolving certain bacteria. To study the chemical composition of its substrate and of substances produced from it by the action of lysozyme, large amounts of culture of *Micrococcus lysodeikticus*, an organism every sensitive to lysozyme, were grown in agar-lined Winchester quart bottles, washed twice with saline and once with acetone, and dried in a Faust-Heim drying apparatus. A high-molecular polysaccharide, acted upon by lysozyme, was isolated from the dried cells, thus confirming the identity of lysozyme as an enzyme belonging to the class of carbohydrases. The method of purification of this polysaccharide is described, together with its properties and hydrolysis by lysozyme. The polysaccharide, isolated from *M. lysodeikticus* as a water-soluble substance, was found, in an insoluble form, in all lysozyme-sensitive organisms investigated, possibly either in a highly polymerized state or combined with a protein resistant to the action of pepsin. The lysozyme sensitivity of some organisms is shown not by lysis but by the complete and irreversible inhibition of their respiration by its action. The conditions essential for lysis of bacteria by lysozyme and the mechanism of lysis are discussed.—R. O. MUIR.

DISEASES CAUSED BY PROTOZOAN PARASITES

TOBIE, J. E. (1940). **Pathogenicity of "Carrier" Strains of *Endamoeba histolytica* in the Experimental Dog.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 691–693.

Attempts have been made to divide human forms of *E. histolytica* into two species differentiated by their pathogenicity. Working with strains of the parasite isolated from children who had never shown clinical symptoms of infection, T. succeeded in infecting 100% of dogs by intragastric inoculation of cysts or intracaecal inoculation of trophozoites. Ten out of 26 experimental dogs developed dysentery, and all showed lesions consisting of

extensive superficial denudation of the mucosa, ragged slit-like ulcers, or typical pin-point lesions. It is concluded that probably all "carrier" strains of *E. histolytica* are pathogenic, and that "healthy human carriers" should be regarded as clinical cases.—U. F. R.

WERNER, H. (1939). Untersuchungen über prädisponierende Zusammenhänge zwischen dem Kalkgehalt des Bodens und der Trichomonadenansiedlung im weiblichen Geschlechtsapparat des Rindes. **[Investigations on Connexion between Chalk Content of the Ground and Trichomonad Colonization of the Genital Organs of Cows].**—*Inaug. Diss., Hanover.* [Translation of abst. in *Berl. Münch. tierärztl. Wschr.* Feb. 14th. 82. (1941)].

The vaginal pH values were weakly alkaline, but no evidence was obtained that an alkaline reaction of the vaginal mucosa predisposed to trichomonad infection. Soil samples of the pastures contained plenty of lime. The blood Ca and P of the cows were normal. No connexion was determined between lime in the soil and trichomonad infection of the genital tract of the cattle.

CAILLEAU, R. (1940). La nutrition de *Trichomonas gallinarum*; l'acide ascorbique, facteur de croissance. **[Ascorbic Acid as a Growth Factor for *T. gallinarum*].**—*C. R. Soc. Biol. Paris.* **134.** 32–34.

Tests were made in a medium of coagulated egg and Locke's solution plus 5% turkey serum. Four attempts to obtain cultures in the absence of ascorbic acid failed and even the presence of the acid produced only poor results. *T. gallinarum* is similar in its nutritive requirements to *T. columbae*, but there is another unidentified actor necessary for its growth which disappears in old liver broth. Ascorbic acid is, however, an indispensable factor for the growth of *T. columbae*, *T. foetus*, and *Eutrichomastix colubrorum* and is also essential for the multiplication of *T. gallinarum*.—C. HORTON SMITH.

HERMAN, C. M. (1941). *Plasmodium durae*, **a New Species of Malaria Parasite from the Common Turkey.**—*Amer. J. Hyg.* Sect. C. **34.** 22–25.

Examination of blood smears from seventy-five turkeys in Kenya showed that one harboured a species of *Plasmodium*, whose elongate gametocytes differ from those of *P. gallinaceum* and *P. relictum*; the mature gametocytes become irregular and somewhat amoeboid in form. They often take up oblique positions at the polar extremities of the host cells although many assume the typical position parallel to the nucleus of the red blood cell. The macrogametocytes stain dark blue while the microgametocytes remain pale after treatment with Giemsa's stain. Transfer experiments show the organism to be extremely pathogenic and fatal to turkey poults, but intravenous inoculations of similar value into chickens, pigeons, and canaries have proved negative. There is evidence that the parasites do not occur as a natural infection of turkeys but are probably parasitic in an East African wild bird. The practical importance of a further knowledge of the organism is obvious, while the fact that a larger bird than the chicken, with more available blood, and suitable for experimental work, can be infected with malaria parasites is of value from the laboratory point of view.—C. H. S.

LEWIS, E. A., & FOTHERINGHAM, W. (1941). **The Transmission of *Theileria parva* by Ticks.**—*Parasitology.* **33.** 251–277.

Experiments are recorded on the influence of climatic and other factors on the transmission of East Coast fever by ticks. The exposure of engorged larvae of *Rhipicephalus appendiculatus* to a temperature of 4°–6°C. failed to retard the development of *T. parva*, and it is considered that, as long as the tick survives, climatic conditions do not kill or weaken the parasite. The absence of the disease in certain areas is ascribed to climatic influences which affect the ticks rather than the development of the parasite.

In the course of the experiments, mild cases of E.C.F. were encountered, but it was shown that the transmission of infection from such cases might result in severe and fatal disease. Although the mild form of the disease appears at times to be associated with light tick infestation, yet a few infected ticks may transmit fatal disease.

A limited number of experiments indicated that ticks do not become infected with *T. parva* if fed on an infected bovine during the first four days of the reaction period. Indications were also obtained that theileriasis might disappear in hungry unfed ticks in less than a year.

Further experiments on the transmission of E.C.F. by ticks fed on animals with "turning

sickness" failed to confirm earlier positive results, but it is suggested that transmission may only be successful from animals in the acute or early subacute stage of this disease.

—U. F. RICHARDSON.

BLOOM, F. (1941). **The Histopathology of Canine Leptospirosis.**—*Cornell Vet.* **31.** 266–288.

Dark-ground examinations of blood and urine were found to be unsatisfactory as a method of confirming the existence of infection in suspected animals. Dark-ground examination of scrapings of kidney or liver tissue usually gave definite positive results.

The sp. gr. of the urine varied from 1·012–1·026, all samples showed an acid reaction, and all but one contained albumin and casts. The blood-urea-nitrogen was decidedly elevated, and moderate anaemia was present. The leucocyte count was usually high with a shift to the left which, in combination with jaundice, is considered to be of diagnostic value.

The presence of haemorrhages throughout the organs is considered as a characteristic lesion in the acute form of the disease. No vascular lesion that could account for the haemorrhages was detected, and it is suggested that the toxic action of the leptospira increased the permeability of the vessel walls.

The liver lesions were variable and more pronounced in icteric animals. An almost constant finding was regenerative activity, but moderate degenerative changes were present, and in one case there was focal necrosis.

In the kidneys, degenerative and inflammatory lesions occurred, a constant feature in the icteric cases being the presence of tubules with atypical regenerated epithelium, the cells often assuming a giant-cell appearance and often completely filling the lumen of the tubules.

The general structure of the lymph nodes and the spleen was normal, though there was usually enlargement of the organs and excess haemosiderin was sometimes present. It is considered that many of the symptoms of leptospirosis are part of the uraemic complex.

—U. F. RICHARDSON.

ESSEVELD, H., COLLIER, W. A., & MOCHTAR, A. (1940). **Leptospirosis in the Netherlands East Indies, with Special Reference to the Virusreservoirs. (Report Presented at the Sixth Pacific Science Congress, San Francisco 1939).**—*Meded. Dienst Volksgezondh. Ned.-Ind.* **29.** 1–9. [In English].

The authors give a survey of many years' work on leptospirosis in animals and man in the Dutch East Indies, where many separate strains or species of *Leptospira* have been isolated, all of which have not yet been correlated with strains from other parts of the world. *L. icterohaemorrhagiae* is very rare: instead species with a low or very low pathogenicity are common in man and in wild and domestic animals. Two D.E.I. species, *L. bataviae* and *L. javanica*, have often been found in cats; they were found in 5·6% of 233 cats examined (seven *L. bataviae* and six *L. javanica*). Serological tests on 300 cats also revealed infection in 24·5% with *L. bataviae* and in 27% with *L. javanica*, whilst *L. icterohaemorrhagiae* was diagnosed in 4%. Rats are the most important reservoir for all species that infect man.—J. E.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

HARBO, J. (1940). Om Forhold ved Adsorption af Mund- og Klovesygens Virus til Aluminiumhydroksyd. **[Value of Foot and Mouth Disease Adsorbed Virus for Immunization].** — *Skand. VetTidskr.* **30.** 411–428. [English summary copied *verbatim*].

In studying the serviceability of virus adsorbed by aluminium hydroxide for immunization against foot-and-mouth disease, in 1937–38 the writer investigated, among other questions, the eluting effect of phosphate ions at pH 7·6 and of changes in pH within the interval where the virus is fairly stable.

From his studies on this question, PYL (1931) thought he was able to establish that a change in pH from 9·2 to 7·6 by itself brings about an elution. In their investigations, SCHMIDT and HANSEN (1936) arrived at results that neither definitely contradict nor confirm the findings reported by PYL.

The results obtained by the writer may be summarized as follows:–

1. By titration on g. pigs it was found that an essential part (here between one and four fifths) of the virus adsorbed by aluminium hydroxide could be eluted by means of 0·2 molar sodium phosphate buffer of pH 7·6.

2. The part of the virus remaining on the adsorbate after the elution was found by intracutaneous titration on g. pigs to exert its pathogenic effect quantitatively, regardless of the adsorption, when 0·05 to 0·2 molar phosphate buffers of pH 7·6 were used for the dilutions.

3. On intracutaneous titration on g. pigs, high-virulent virus adsorbate appears to give the same result as the corresponding free virus when the dilution is carried out with 0·05 to 0·2 molar phosphate buffers of pH 7·6. When pure water is used for the dilution, however, the result of the titration is essentially lower.

4. A change in pH within the interval in which the virus is fairly stable is not in itself, as assumed by PYL, sufficient for elution of the virus. At all hydrogen ion concentrations within this interval aluminium hydroxide has a strongly adsorbing effect on the virus.

5. At pH of about 7·6 the phosphate ions have a displacing effect on the virus molecules. This effect increases with increasing concentration of phosphate.

The virus is readily adsorbed by aluminium hydroxide at pH 7·6 even in a solution containing phosphate if only the phosphate concentration is lowered sufficiently by dilution with pure water.

6. The experimental results found previously, by PYL and by SCHMIDT and HANSEN are confirmed. Only PYL's conclusions, not his experiments, are in conflict with the subsequent findings. It is pointed out that the experimental technique employed by PYL cannot lead to an unambiguous result, and that among the possible interpretations PYL has chosen the wrong one.

I. PALLASKE, G. (1940). Zur Frage spezifischer und unspezifischer Muskelerkrankungen bei Maul- und Klauenseuche. **[Specific and Non-Specific Muscle Lesions in Foot and Mouth Disease]**.—*Tierärztl. Rdsch.* **46.** 165–168, 177–181, 189–193 and 202–204.

II. COHRS, P. (1941). Zur Frage spezifischer und unspezifischer Muskelerkrankungen bei Maul- und Klauenseuche. **[Specific and Non-Specific Muscle Lesions in Foot and Mouth Disease]**.—*Ibid.* **47.** 103–104.

III. PALLASKE, G. (1941). Zur Frage spezifischer und unspezifischer Muskelerkrankungen bei Maul- und Klauenseuche. **[Specific and Non-Specific Muscle Lesions in Foot and Mouth Disease]**.—*Ibid.* 104–105.

I. Samples of skeletal muscle showing abnormal naked-eye changes were taken from cattle slaughtered during the course of a F. & M. disease outbreak, or from cattle recovered from the disease, and were submitted to histological and bacteriological examination.

The lesions of 12 of the 22 samples examined were found to be sterile. Macroscopically, these sterile lesions stood out from the normal muscle as variegated pale areas, or as irregular, well defined areas of a greyish-white colour which resembled fish flesh; occasionally they were slightly darkened or of a fat-like character. The lesions varied in extent from 1–10 cm. and some were blotched or tinged with dark red. They occurred on the surface and in the depth of the muscle and appeared most frequently in the hind limbs, but were also found in other regions, including the diaphragm and tongue.

Histological examination of the less pronounced lesions revealed a hyaline-like degeneration of the muscle fibres. In further advanced lesions there was infiltration with histiocytes and fibroblasts leading to fibrous organization and, in some cases, to calcification. The dark red areas observed macroscopically in some of the lesions were due to interstitial haemorrhage.

No direct examination of the sterile lesions for virus was made, but the similarity of the histological changes with those observed in the myocardium of cattle dying from myocarditis in the initial stages of the malignant type of the disease was considered to justify the opinion that the cause of these lesions was the F. & M. virus.

In the other samples of muscle examined, the majority of the lesions were obviously of a purulent or gangrenous nature. Four, however, were somewhat similar to the sterile lesions, but histological examination revealed the presence of bacteria, along with marked leucocytic infiltration. All these lesions were regarded as having a metastatic origin from septic foci in the feet or udder.

II. C. refers to his article [*V. B.* **11.** 853.] in which he classifies the muscular changes caused by F. & M. disease as (A) an acute generalized myositis, and (B) a local myositis. The latter group was subdivided into those changes involving (i) an acute hyaline degenera-

tion, (ii) necrosis and chronic myositis, (iii) interstitial haemorrhage and haematomata, and (iv) purulent foci.

A purulent lesion which undoubtedly originated in a typical specific lesion is described, and C. considers this to be the usual origin of all such lesions.

III. A discussion of the previous two articles with special reference to the origin of non-sterile lesions.—H. H. SKINNER.

—. (1939). Esperimenti di vaccinazione antiaftosa secondo il metodo Waldmann. **[Foot and Mouth Disease Vaccination by the Waldmann Method].**—*IV Congr. int. Pat. comp., 1939.* **2.** 257–260. [In Italian].

Good results are claimed in field experiments with Waldmann vaccine prepared in Italy. Six animals out of 1,637 vaccinated in one area became infected, while the disease ran through unvaccinated controls. In Sardinia, where F. & M. disease appeared after an absence of about 20 years, an attempt was made to " ring " the outbreaks. Cattle, sheep, goats, and swine were inoculated, and, in a total of 6,484 animals, only 0·61% developed the disease. In the discussion on this report, WALDMANN referred to the keeping quality of the vaccine. Storage at 4°–7°C. for five months does not impair its immunizing power.—J. B. BROOKSBY.

*CILLI, V. (1937). Ricerche sul vaccino neurotropo contro la peste equina. **[Research on a Neurotropic Vaccine against African Horse Sickness].**—*Com. III Congr. Stud. Colon., Firenze, 1937.* [Abst. from abst. in *Nuova Vet.* **15.** 169].

C. isolated two Eritrean strains of the virus from two mules which had died of the disease. During intracranial passage in g. pigs and rats, the neurotropic properties of the virus progressively increased, the animals showing increased nervous symptoms, and the interval before death became progressively shorter. After passage the virus proved fatal to horses, but provoked only a slight reaction in mules. No conclusions were drawn as to the immunizing properties of the passaged virus against homologous and heterologous strains of a viscerotropic virus.

CILLI, V., & SFORZA, M. (1939). Sopra alcune caratteristiche biologiche del virus neurotropo della peste equina. **[Some Biological Characteristics of the Neurotropic Virus of African Horse Sickness].**—*Nuova Vet.* **17.** 208–213.

The paper describes the continuation of work by the authors [see preceding abst.] on the development of a neurotropic virus by intracranial passage in g. pigs. One strain at the eighth and another at the 13th g. pig passage produced symptoms of the disease when inoculated subcutaneously or intravenously into mules, but the animals survived. Two horses receiving material from the 15th passage died in 20 and 22 days. The 54th passage of one strain was innocuous when given to a mule by the subdural route, but a horse subjected to the same treatment died in 15 days.

The disease in g. pigs has an incubation period of 4–28 days, periods less than ten days being found with passaged virus. Death occurs 24 hours after the appearance of symptoms. The brain is infective in a dilution of 1 : 20,000, and the virus can be recovered only from the central nervous system. It is possible to infect g. pigs with neurotropic virus by any of the usual routes. The virus produces abortion in pregnant g. pigs, but there is no evidence that it can cross the placental barrier. Virus survived in equal parts glycerin-saline at 7°C. for 6–9 months, and in 1% saline at 18°–20°C. exposed to diffuse light it was viable after 58 but not 69 days. 1% phenol at room temperature was viricidal in 13 but not in 8 days, while at 37°C. the virus was inactivated in 12 hours. Incubation of virus at 37°C. in 1% saline did not inactivate within 60 hours.—J. B. B.

CILLI, V. (1939). Il virus neurotropo della peste equina. **[The Neurotropic Virus in African Horse Sickness].**—*IV Congr. int. Pat. comp., 1939.* **2.** 251–255. [In Italian].

C. describes further experiments on the use of g. pig neurotropic virus as an immunizing agent against African horse sickness. Nine mules and two horses each received, at intervals of one week, 10 c.c. of emulsion of g. pig brain as follows :– (1) strain A, 55th g. pig passage, (2) strain B, 67th passage, and (3) a mixture of strain A, 58th passage and strain B, 68th passage. Mild symptoms of the disease were evoked by these inoculations. Thirty-five days later, eight of the mules and one horse were taken, with five mules and three horses (untreated) as controls, into an infected area for 85 days. Of the vaccinated animals, one mule

died of the disease, while among the controls, two mules and two horses were affected and died. 178 days later, the survivors, together with the animals vaccinated but not exposed, were subjected to the severe test of subcutaneous inoculation with a virulent strain. One vaccinated horse died, while, of the controls, two mules and one horse died.

—J. B. BROOKSBY.

TORRANCE, C. C. (1940). **A Note on Immunologic Reactions Associated with Equine Infectious Anaemia.**—*Amer. J. vet. Res.* **1.** 63–65.

T. describes a preliminary attempt to prepare a diagnostic agent for use in E.I.A. The serum globulins from two infected animals were partially purified by dialysis and acetone precipitation. When given subcutaneously to each of seven horses (four with definite clinical symptoms and three with questionable symptoms) all the definite, and two of the doubtful, cases reacted with an elevation of temperature of 1°–5°F. in the ensuing 48 hours. Only one definitely non-infected animal was tested, and no reaction was obtained. T. remarks that the possibility of viable virus in the preparation, with the risk of production of carriers, must be investigated.—J. B. BROOKSBY.

HAMMON, W. M. (1941). **Encephalitis in the Yakima Valley. Mixed St. Louis and Western Equine Types.**—*J. Amer. med. Ass.* **117.** 161–167.

Encephalitis had been common in human beings and in horses in the Yakima Valley, Washington before 1940. In 1940 it reached epidemic proportions and 86 persons and at least 20 horses were attacked. Of the sera of 50 patients tested, 14 neutralized Western equine encephalomyelitis virus, 8 the St Louis virus, and 28 both viruses. Full clinical details of the human cases are given.—J. E.

DAVIS, J. H. (1940). **Equine Encephalomyelitis (Western Type) in Children. Report of Cases with Residual Atrophy of the Brain.**—*J. Pediat.* **16.** 591–595.

D. gives a description of the clinical symptoms of E.E. (Western type) in two children in California who contracted the infection at the age of 2½ months. The first patient was examined at the time of infection and the second at the age of four years, but the serum of both patients gave a positive reaction to neutralization tests for E.E. at the time of examination, this having thus persisted in the blood of one case for four years. Both children were left permanently mentally defective as a result of the infection.

The disease is prevalent in horses in the district.

SANDERS, M., & MOLLOY, E. (1940). **Cultivation of Virus of Equine Encephalomyelitis in Serum-Ultrafiltrate and Buffered Salt Solution (Simms).**—*Proc. Soc. exp. Biol., N.Y.* **45.** 327–332.

The authors report the successful serial cultivation of both types of north American E.E. virus on tissue cultures prepared by adding minced embryonic chick tissue to serum ultrafiltrate diluted with Simm's salt solution. Growth was equally good at room or incubator temperature. For potency titration by intracerebral inoculation of mice after 3–30 days' culture, supernatant tissue-culture fluid was used; its highest infective titre was 10^{-7}. This fluid was also tested as the basis for a vaccine by means of the addition of 0·4% formalin. G. pigs which received two doses of this product resisted 1,000 and 10,000 m.l.d. of virus.

It is suggested that this type of vaccine may have a useful future in place of the established egg-embryo vaccine, which contains about 40% of embryo tissue extract and is consequently capable of inducing foreign-protein reactions.

—J. E.

HOWITT, B. (1941). **Relationship of Moscow 2 Virus of Equine Encephalomyelitis to Rabies.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 69–73.

In 1935, VICHELESSKY *et al.* isolated a virus from horses affected with encephalomyelitis in Russia. They noted that the virus had characters of rabies virus, but even so considered that it was more akin to the virus of E.E. [see *V. B.* **6.** 228]. H., after making immunological tests with this virus, considers that it is the virus of rabies and not of E.E.

The Russian strain was very potent and killed laboratory animals after an incubation period of only two days, and Negri bodies could not be found in the brains of such animals until steps were taken to delay the course of infection by using subcutaneous injections.

An additional proof of its identity was supplied by its virus particle size being found to be 80–130 mμ (some four times the size of that of encephalomyelitis virus).—J. E.

HABEL, K. (1941). **Factors Influencing the Efficacy of Phenolized Rabies Vaccines. II. Virus Content of Vaccine.**—*Publ. Hlth Rep., Wash.* **56.** 641–649. [For part I, see *V. B.* **11.** 225].

A description is given of experiments carried out (a) to ascertain the relationship of the immunizing power of rabies vaccines to their virus content, and (b) to find what factor in the animal passage of fixed rabies virus determines the amount of virus in the brain. Under (a) one series of groups of mice received a phenolized vaccine in various dilutions (the amount of virus inoculated thus varying according to the dilution), while a second series received specially prepared liver virus and phenolized vaccines in which the virus content varied. In both series test doses of a "fixed" virus in tenfold dilution were injected intracerebrally 21 days after inoculation. It was clearly shown that the degree of immunity produced was determined by the amount of virus injected. Under (b) various factors which may influence the amount of virus in the brains of experimental animals inoculated with "fixed" rabies virus were investigated. H. affirms that the rapidity with which the animal passage is made is immaterial and suggests that in making vaccine only the brain should be used. He describes a technique for producing the maximum virus content in the brain preparatory to the manufacture of vaccine.—J. R. LAWSON.

WYCKOFF, R. W. G. (1941). **Laboratory Tests of the Potency of Antirabic Vaccines.**—*Amer. J. vet. Res.* **2.** 84–90.

The potency of a number of rabies vaccines was determined by the mouse protection test devised by WEBSTER [*V. B.* **9.** 88; **10.** 26 and 254.] and modified by WYCKOFF & BECK [*V. B.* **11.** 225]. [See also HABEL—*V. B.* **11.** 764]. It was found that good commercial vaccines conveyed a powerful immunity, but that there were certain batches on the market which were too weak to give a satisfactory protection to mice. Serial samples from the same manufacturers might show wide variations in potency.—R. E. GLOVER.

BERNKOPF, H., & KLIGLER, I. J. (1940). **Characteristics of a Fixed Rabies Virus Cultivated on Developing Chick Embryos.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 332–335.

The authors report the successful cultivation of "fixed" rabies virus in developing chick embryos down to the 47th passage. Six-day embryos were infected by dropping virus on to the allantois immediately over the embryo. It was recoverable from the allantois and embryo brain four days later and reached its maximum titre (10^{-4}) after nine days, remaining at that level until hatching time. It was not lethal to the embryos and newly hatched chicks were healthy and had apparently rid themselves of infection at about the time of hatching.

The virulence of virus cultivated in this way remained steady for chick embryos, mice, and g. pigs, but apparently declined slightly for rabbits, as judged from the increased incubation period.—J. E.

CLARK, P. F., RASMUSSEN, A. F., Jr., & WHITE, W. C. (1941). **Further Studies on the Purification of Poliomyelitis Virus.**—*J. Bact.* **42.** 63–81.

Poliomyelitis virus, partially purified by extraction with ether, is precipitated by half saturation but not by one-third saturation with ammonium sulphate; precipitation is most effective at pH 4·5. Initial dialysis with distilled water showed that the virus comes down with the globulins and again in both the euglobulin and pseudoglobulin fractions. The Beams ultracentrifuge, exerting a force of 40,000–60,000 times gravity was effective in sedimenting the virus. As the sedimentation of the virus appears to take place more rapidly than the sedimentation of the proteins in solution, nitrogen determinations on the various centrifuged portions are not related to the changes in virus titre.—R. ALLCROFT.

HABER, P. (1939). L'encéphalite américaine, le louping-ill, la peste aviaire; mécanisme de leur dispersion centrifuge chez la souris. **[St Louis Encephalitis, Louping Ill, and Fowl Plague; Mechanism of Centrifugal Dispersion of Virus in Mice].**—*C. R. Soc. Biol. Paris.* **131.** 45–46.

The route by which infection reaches the reproductive organs following intracerebral inoculation of these viruses has been traced in mice. The mechanism of dispersal appears to differ in the three cases. For St Louis encephalitis the route is probably along the nerves, whilst for louping ill it is likely that infection through the bloodstream plays a part. The spread of infection in fowl plague is solely through the blood.—R. A. KEKWICK.

I. WEIDLICH, N. (1940). Die ansteckende Schweinelähmung. (Teschener Krankheit, Meningo-Encephalomyelitis non purulenta enzootica suum). Sammelreferat. [**Porcine Encephalomyelitis (Porcine Infectious Paralysis, Teschin Disease). Review**].—*Dtsch. tierärztl. Wschr.* **48.** 397–401.

II. MEYN, A. (1940). Die ansteckende Schweinelähmung (Teschener Krankheit) im Kreise Leipzig. [**Porcine Encephalomyelitis in the Leipzig Area**]. —*Ibid.* 277–281.

III. MARK. (1940). Die ansteckende Schweinelähme (Teschener Krankheit). [**Porcine Encephalomyelitis, Observations from Practice**].— *Berl. Münch. tierärztl. Wschr.* July 26th. 361–363.

IV. BAUMANN, R. (1940). Die histologische Diagnose der Teschner Schweinelähmung. (Encephalomyelitis non purulenta enzootica suum, sog. Böhmische Seuche). [**Histological Diagnosis of Porcine Encephalomyelitis**].—*Ibid.* May 10th. 217–219.

V. KMENT, A. (1940). Zur Histopathologie des Zentralnervensystems bei der Teschner Schweinelähmung. (Meningo-Encephalomyelitis enzootica suum). [**Histopathology of the Central Nervous System in Porcine Encephalomyelitis**].—*Wien. tierärztl. Mschr.* **27.** 83–92 and 102–111.

VI. —. (1940). Bekämpfung der Schweinepest und ansteckenden Schweinelähme (Teschener Krankheit). [**Control of Swine Fever and Porcine Encephalomyelitis**].—*Tierärztl. Rdsch.* **46.** 447–449.

VII. —. (1940). Die ansteckende Schweinelähme (Teschener Krankheit). Gemeinfassliche Belehrung. [**Porcine Encephalomyelitis**]. — *Dtsch. tierärztl. Wschr.* **48.** 344.

VIII. KÖVES, J. (1940). Ansteckende Schweinelähmung oder Aujeszkysche Krankheit? [**Porcine Encephalomyelitis or Aujeszky's Disease?**]—*Ibid.* 474.

IX. SRNETZ, A. (1940). Beitrag zur Aetiologie der Ferkellähme (Teschener Krankheit). [**The Aetiology of Porcine Encephalomyelitis**].—*Berl. Münch. tierärztl. Wschr.* Oct. 4th. 483.

X. FINGERLOS, K. (1940). Schweinelähme-Vakzine und Teschener Krankheit. [**Vaccination against Porcine Encephalomyelitis**].—*Wien. tierärztl. Mschr.* **27.** 252–254.

I. This is a review and a detailed systematic description of porcine encephalomyelitis [P.E.]. The disease has been known since 1913, when it was noticed in Moravia, but was not properly investigated until 1930, when it was causing appreciable losses in the district of Teschin (Poland-Moravia border). KLOBOUK [*V. B.* **4.** 466.] then discovered that it is caused by a filtrable virus. All breeds of swine and pigs of any age are susceptible, although the younger ones are usually affected. Diet and management have little influence on susceptibility, but cold wet weather is a predisposing or exciting factor. The disease is not highly contagious, as only part of a herd becomes affected as a rule and new cases occur at long intervals in an infected area. Morbidity in a herd may vary from 20–50% and direct mortality from the acute form is about 80%. The incubation period seems to vary from 3–30 days.

The course may be acute or subacute merging into chronic. In the acute form the clinical picture is one of acute encephalitis with death in 3–4 days. The slower type takes the form of a progressive paralysis from behind forwards. There is fever only in the acute form. About 20% of pigs affected subacutely die directly from the effects and most of the remainder die from secondary effects or have to be killed on account of failure to resume normal growth.

There is no P.M. organic lesion of diagnostic value and diagnosis is based on the epidemiology, case histories, and histological examination [see V below].

The disease has been transmitted to pigs by means of brain or spinal-cord tissue, but the usual laboratory animals are resistant. [The statement that MACEK (*V. B.* **8.** 361.) passed the disease to laboratory animals is evidently false.] The natural mode of infection is unknown, but is presumably by ingestion.

Attempts have been made to produce a vaccine; the Mödling Institute near Vienna has issued a formolized nerve-tissue vaccine, which was being tested in the field in 1940 [see X below].

Control by police methods was instituted by an order of April 2nd, 1940 [see VI below].

II. M. states that P.E. now occurs throughout Bohemia, Moravia, and Austria and has recently appeared in the Leipzig area, where he describes four outbreaks, giving an illustrated account of the disease symptoms. The characteristic P.M. lesion was inflammation of the lumbar spinal cord (perivascular infiltration). Eight healthy piglets were inoculated subdurally with spinal-cord suspensions from pigs killed at the height of the disease. Four contracted P.E. after a lapse of three weeks.

III. This is a clinical (illustrated) description of P.E. as observed in the Sudetenland. The disease is considered to be of considerable importance in that region.

IV. A short illustrated account of the histological lesions, which consist of a non-purulent polio-encephalitis and myelitis. The lesions are most noticeable in the lumbar spinal cord, are limited to the gray matter, and are represented by degeneration of ganglion cells, perivascular cellular infiltration and growths of glia cells. Although somewhat similar changes occur also in swine fever and Aujeszky's disease, in both they occur equally in the gray and in the white matter. For rapid diagnosis, B. recommends the examination of frozen sections of the lumbar cord, stained by haematoxylin and eosin.

V. In this inaugural dissertation K., who studied under BAUMANN [see IV], describes in great detail the result of histological examination of the central nervous system of 13 cases of P.E., sections being made of the cerebral cortex, hippocampus, cerebellum, medulla oblongata, and cervical, thoracic and lumbar spinal cord. In all cases the spinal cord showed the greatest changes and in it the ventral horns of the gray matter were most severely affected. The ganglion cells suffered two kinds of injury: in one the cell contents and nuclei were liquefied, vacuolated, and karyorrhectic, and Nissl's rings were in evidence. In the second kind of injury the cells were occupied fully by a swollen chromatophile substance and the nuclei were displaced. This type of cell stained as a solid blue mass. The sections also showed a mainly lymphocytic and perivascular infiltration in both the gray and white matter. Similar but less intense changes were found in the brain and here the larger blood vessels were noticeably congested, even to naked-eye examination. No inclusion bodies were to be seen.

VI. This is a circular from the German Ministry of the Interior dated May 22nd, 1940, giving instructions for the veterinary police control of P.E., including official diagnosis and compensation due to owners whose herds of pigs are slaughtered when P.E. is diagnosed in them. It also contains the official description of the disease, issued to facilitate its recognition.

VII. This is a copy of the official description.

VIII. K. suggests that what is regarded as the acute form of P.E. may actually be Aujeszky's disease. To test this theory he recommends the intramuscular injection of rabbits with a filtrate of lung or spleen extract. Aujeszky's disease virus injected in this way causes an intense and characteristic itching.

IX. S. reports the finding, in Bohemia, of a disease of young pigs which corresponds with the description of P.E., except that it typically affected every piglet in a litter and did not spread in a herd. In all cases P.M. inspection revealed interstitial hepatitis and no other organic lesions. S. suggests the possibility that the hepatitis may be a casual or a regular accompaniment of P.E. If not, this disease, which clinically resembles P.E., requires to be investigated and so differentiated from it. [No other author mentions any liver change in P.E.]

X. P.E. assumed serious dimensions in the Linz area (Upper Danube) in the winters of 1938–39 and 1939–40. During a period of 18 months, 77 villages with 1,500 pigs became infected and 540 pigs (36%) were stricken. Only 45 (8%) recovered.

The Mödling vaccine was used with good effects in this region, though sufficient data for appraising its value were not then available.

—J. E.

MACCOLINI, L. (1938). Considerazioni eziopatogenetiche sulla cosidetta "Malattia dei Porcai" in base ad un caso osservato in provincia di Forlì. **[A Case of Swine-herd's Disease Observed in the Province of Forlì]**.—*G. Clin. med.* **18.** 315–322.

M. describes the first recorded case of swine-herds' disease in the province of Forlì, Italy. The patient was a pig dealer who had forcibly administered medicine *per os* to sick pigs. M. discusses various pig diseases in an effort to establish a relationship to S.D. No light is thrown on the aetiology of the disease.

SHOPE, R. E. (1941). **The Swine Lungworm**

as a Reservoir and Intermediate Host for Swine Influenza Virus. I. The Presence of Swine Influenza Virus in Healthy and Susceptible Pigs. II. The Transmission of Swine Influenza Virus by the Swine Lungworm.—*J. exp. Med.* **74.** 41–47 and 49–68.

I. It has been shown that infection with the swine influenza virus and *Haemophilus influenzae suis* is necessary to produce the typical clinical picture of swine influenza. The possible role of the pig lungworm in the transmission of infection was suggested to S. in the course of studying the use of *H. influenzae suis* vaccines in the prophylaxis of the disease. Owing to the depletion of the stock of laboratory pigs, 27 pigs were obtained from a breeder. Two of these pigs were tested for susceptibility to swine influenza and were found to be fully susceptible. The blood sera of the remaining pigs were tested for the presence of swine influenza virus neutralizing antibodies. Such antibodies were absent from the blood of all pigs, except three which gave partial neutralization of virus in a dilution of 1 : 2. A titre of this order would be too low to be the result of previous infection.

Multiple intramuscular injections of different kinds of *H. influenzae suis* vaccines precipitated attacks of swine influenza in these pigs. In pigs which had had heat-killed vaccine, the illness resembled " filtrate " disease, but those pigs which received living *H. influenzae suis* as vaccine developed typical swine influenza.

II. During an investigation of the lay belief that earthworms may play a part in the spread of swine fever, S. ran parallel experiments with swine influenza virus. Any role that earthworms might play in such spread would be due to their being infested with swine lungworm larvae. Earthworms obtained from soil free of contamination with swine faeces were placed in barrels containing soil and leaf mulch. Lungworms from pig lungs and pig faeces were placed in the barrels for the earthworms to ingest. Subsequent examination of the earthworms confirmed that they had become infested with these larvae.

Generally S.'s experiments took the form of feeding pigs with such infested earthworms and later inoculating the pigs with *H. influenzae suis*. These injections were followed by typical swine influenza attacks in many pigs. S. concludes that swine influenza virus was present in a masked, non-infective form in the lungworm larvae and a provocative stimulus, such as the injection of *H. influenzae suis*, is required to cause swine influenza. These results were obtained at all seasons of the year except the summer. Some pigs subjected to these experimental procedures became immune instead of becoming infected. Such cases may be explained by the fact that the lungworms became lodged outside the lungs. Direct attempts to demonstrate virus in the lungworm larvae failed, but according to the above theory it appeared that the virus can persist in the lungworms for at least two years.

The parallel experiments with S. F. virus yielded negative results. In S.'s opinion these findings explain the infections induced by the inoculation of *H. influenzae suis*, described in I.

—D. L. HUGHES.

—. (1941). **Discussion on Swine Influenza in the British Isles.** [Speakers: BLAKEMORE, F., GLEDHILL, A. W., GLOVER, R. E., & TAYLOR, E. L.]—*Proc. R. Soc. Med.* **34.** 611–618. [French, Spanish and Portuguese summaries].

BLAKEMORE and GLEDHILL investigated outbreaks of pneumonia in pigs 10–14 weeks old. The mortality was low and recovery prolonged. The first outbreak they saw was typical of swine influenza and, although the clinical picture in the other outbreaks was not quite the same, four strains of virus were recovered which on intranasal instillation into ferrets gave rise to the influenza syndrome. *Haemophilus influenzae suis* was also recovered from some of the cases in pigs. The disease in Great Britain may be accompanied by unthriftiness and recovery may be slow. These features are also part of the disease in Northern Ireland, but there unweaned pigs are frequently affected. In the U.S.A. the disease is more acute with rapid recovery. These two workers were not able to isolate *H. influenzae suis* from all their cases. Streptococci, *Pasteurella suiseptica*, *Brucella bronchiseptica*, and Gram-positive bacilli were more commonly isolated. They found no evidence that the presence of swine lungworms (*Metastrongylus elongatus*) played any part in the development of the disease, although LAPAGE found that 24 out of 52 normal lungs contained this parasite.

GLOVER described work performed with C. H. ANDREWES on the antigenic structure of these British swine influenza virus strains and

their relation to the American strains and to human influenza virus strains. Although these studies were still to be completed, the results available suggested that the British porcine strains form a less compact group than the American strains and that they are somewhat different from them. They do not appear to be as clearly separated from the human viruses as those of Shope. G. considered that they may bridge the gap between the American porcine strains and the human influenza strains.

TAYLOR discussed the feasibility of Shope's proposal that the pig lungworm is directly concerned in the transmission of the disease. PURCHASE and TAYLOR tried to set up bacterial infection in g. pigs and rabbits by infesting them with nematode larvae which damage the intestinal mucosa. The organisms used were salmonella and *Bacillus anthracis*. These experiments failed. Apart from blackhead in turkeys and possibly foot-rot in sheep, there appears to be no well documented disease transmitted by means of parasitic worms. The so-called "salmon poisoning" of dogs caused by the ingestion of salmon infested with flukes is evidence on the other side, but the actual causal agent has not been determined. T. did not consider the evidence complete enough to accept Shope's lungworm theory of the transmission of swine influenza.—D. L. HUGHES.

ANDREWES, C. H., & GLOVER, R. E. (1941). **Spread of Infection from the Respiratory Tract of the Ferret. I. Transmission of Influenza A Virus.**—*Brit. J. exp. Path.* **22.** 91–97.

GLOVER, R. E. (1941). **Spread of Infection from the Respiratory Tract of the Ferret. II. Association of Influenza A Virus and Streptococcus Group C.**—*Ibid.* 98–107.

I. Infective agents can probably become air-borne in three ways:–(1) as the relatively large droplets expelled from the mouth or nose, (2) dried on particles of dust, and (3) as the "droplet-nuclei" of WELLS & WELLS (1936), which are droplets expelled from the mouth or nose so rapidly that they lose water by evaporation and become small enough to float in the air for many hours.

Cross-infection between ferrets infected with influenza A virus and normal ferrets took place in two out of three trials employing one donor and in six out of eight with two donors, even though the animals were separated by about 5 ft., and the recipients were 3 ft. above the donors. Good ventilation decreased the chance of infection, presumably by decreasing the number of infective particles. In experiments in which donor and recipient were connected by a duct through which air was drawn at a known speed, it was found that infection occurred, even when the duct contained two right-angled bends, and the air-speed was as low as 3 ft. per min. Infective droplets about 0·1–1 mm. in diameter would be unlikely to pass round corners at such low air-speeds, and it is therefore probable that infection was conveyed by droplet-nuclei, or by very fine dust particles.

II. During the studies reported in the preceding paper, there occurred by chance an infection of a ferret with a group C streptococcus in addition to influenza A virus. The association of the two agents produced disease of more than usual severity, with a fluctuating high temperature arising 24 hours after exposure, and lasting for up to ten days if the animal survived, in contrast to the double-peaked temperature curve of the pure influenzal infection. The disease could be set up by virus and cultures of the streptococcus given simultaneously or within seven days after the virus, but the organism failed to establish itself in the nose of the normal ferret. The aerial spread of the streptococcus was studied by exposing blood-agar plates in various positions in relation to a cage containing an infected ferret. The greatest number of colonies appeared on plates nearest to the ferret, and those on the same level. The disease was transmitted from infected ferrets to normal ferrets in close contact and over a distance of 4 ft. to ferrets with influenza A infection. Failure to infect normal ferrets at a distance of 4 ft. was considered to be due to poor dissemination by the donors, which were affected by considerable blocking of their nasal cavities. On P.M. examination, localization of the organism in the tonsils was found when the animal had been shown to have ceased to emit it in the expired air.—J. B. BROOKSBY.

SLAGSVOLD, L. (1938). Geitekopper og smittsomt vesikulöst, verruköst utslett hos sau og geit. **[Goat Pox and Allied Conditions in Sheep and Goats in Norway].**—*Skand. VetTidskr.* **28.** 471–495. [English summary].

This is a detailed account and discussion on

the nature of diseases of goats and sheep in Norway known as *sorkje* and *geitekopper*, the former name being used for pox limited to the mouth region in kids or lambs and the latter for udder and teat lesions in milch goats. Numerous outbreaks have occurred in Norway, beginning commonly in the spring when goats are turned out on communal pastures. Newly purchased animals are a common source of infection in a given district, though outbreaks may also occur from the survival of virus without a new source being introduced. After a district has been infected for a few consecutive years and as the local goat and sheep pass through the disease, infection dies out.

In kids, typical pox scabs form around the lips and nostrils, whilst in lactating goats the teats and udder are commonly affected, though here the lesions are often vesicular. The severity of infection varies greatly and may result in generalized pox eruptions in many parts of the body and secondary bacterial or fungous infection may supervene and cause death.

Transmission experiments showed that *sorkje* and *geitekopper* are identical; they are presumed to be variola caprina. The disease is readily transmissible between goats and sheep, but attempts to infect cattle, pigs, horses, rabbits, g. pigs, and poultry failed. Sheep and goats once infected were found to be immune later. —J. E.

SUHACI. (1939). Rezultatele practice ale vaccinărilor antivariolice la oi. [**Vaccination Against Sheep Pox**].—*Rev. Med. vet., Bucureşti.* **51.** 155–177.

S. reviews the many methods employed in preparing sheep-pox vaccines and describes the preparation of a sensitized vaccine by the Pasteur Institute of Bucarest from strains of virus provided by the Pasteur Institute of Algiers.

A total of 16,237 sheep was vaccinated, 5,281 of these being in healthy flocks and the remainder in affected flocks. Positive reactions were obtained in 72·81% of the first group and 75% of the second.

In no case did the vaccine cause generalized symptoms. Immunity was established in 48 hours, and no new cases of sheep pox appeared 11 days after vaccination. The local reaction to the injection was a small nodule in most cases, only 2·4% of animals from healthy flocks and 3·6% from infected flocks showing a local pustule. Many animals showed a transient lameness following vaccination. Delicate breeds showed depression and inappetence during the post-vaccinal fever, but this disappeared when the local oedema passed off. Lactating animals suffered a temporary diminution in milk yield but returned to normal in eight days.—M. W.

BECKER, F. T. (1940). **Milkers' Nodules.**—*J. Amer. med. Ass.* **115.** 2140–2143. Discussion pp. 2143–2144.

The occurrence of "milkers' nodules" is described in four human beings milking cows on whose udders there were open ulcers or encrusted lesions. The relationship of the nodules to vaccinia is discussed. In two of the cases the Paul test (corneal inoculation of rabbits) was negative. B. suggests that the causative agent is an attenuated or biological modification of vaccine virus, and states that it closely resembles the paravaccine of Lipschütz (1932) which does not immunize against cow-pox lymph. This fact held good in two of the four cases, which occurred in persons who had never been vaccinated against smallpox; they were so vaccinated after recovery from the milkers' nodules lesions and reacted normally.—J. E.

MAGNUSSON, H. (1940). En ny hönssjukdom (inf. laryngotrakeit). [**A New Poultry Disease in Sweden—Infectious Laryngotracheitis**].—*Skand. VetTidskr.* **30.** 629–637. [English summary].

A description of an infectious disease outbreak in a poultry farm near Lund, Sweden, which was found to be due to the virus of infectious laryngotracheitis. The mortality was 50%. A warning is given to Swedish veterinary surgeons to look out for the disease. It is a notifiable disease which must in Sweden be controlled by the slaughter of affected flocks. —J. E.

UBACH, F. A. (1937). Observaciones de patología ornitológica. Psitacosis y seudo-psitacosis. [**Psittacosis in South American Birds, with a General Review**]. —*Rev. Med. vet., B. Aires.* **19.** 469–496.

U. lists the birds which can be infected, naturally or experimentally, with psittacosis. They include canaries, budgerigars, love birds, parrots, parakeets, and owls.

He also describes diseases which may be confused with psittacosis including "pseudo-psittacosis" a virus disease of birds observed

in São Paulo, Brazil by PACHECO and BIER (1931). This may be distinguished from true psittacosis by the existence of intranuclear, acidophile inclusion bodies in the reticulo-endothelial cells.

He also describes two bacterial "pseudo-psittacoses", one caused by an organism resembling Nocard's bacillus of psittacosis [*Salmonella typhi-murium*] and the other by another paratyphoid organism.—M. WATSON.

YAMAGIWA, S., & NIWA, M. (1938). [**An Infectious Fowl Disease in Manchukuo. I. The Fowl Plague Syndrome**].—*J. Jap. Soc. vet. Sci.* **17.** 78–117 of pt. 1. [In Japanese: abst. from German summary pp. 11–13 of pt. 2].

YAMAGIWA, S. (1938). [**Studies on an Outbreak of Fowl Plague in Manchukuo. II. An Unusual Strain of Virus**].—*Ibid.* 127–138 of pt. 1. [In Japanese: abst. from German summary pp. 17–18 of pt. 2].

YAMAGIWA, S., & NIWA, M. (1938). [**Studies on an Outbreak of Fowl Plague in Manchukuo. III. Immunological Tests**].—*Ibid.* 139–151 of pt. 1. [In Japanese: abst. from German summary pp. 19–20 of pt. 2].

These papers describe research on fowl plague in Manchukuo, which proved to be of a slightly different form from that which occurs in Europe, Korea, Japan, and the Philippine Islands.

I. The summary comments on the symptoms of the disease as it occurs in Manchukuo and as it affects birds that are artificially infected.

II. The newly isolated virus caused the disease in fowls with an unusually long course in the first few passages; then the virulence increased and the virus killed fowls more rapidly.

III. Cross-immunity tests demonstrated the immunological unity of the viruses from countries mentioned above.

IMMUNITY

MICHALKA, J. (1939). Ueberempfindlichkeit und Immunität bei Schweinerotlauf und Schweinepest und ihre Auswirkungen auf die Impfungen. [**Hypersensitivity and Immunity in Swine Erysipelas and Swine Fever and their Effect on Immunization**].—*Wien. tierärztl. Mschr.* **26.** 449–464, 483–495, 513–533, and 545–552.

A statistical analysis of losses following swine erysipelas vaccination in Germany proved the need to investigate "breakdowns" in vaccination. The advantages and disadvantages of serum-virus immunization are discussed and there is a note on the mechanism of allergy.

It was the aim of the investigation to determine whether "breakdowns" in vaccination could be ascribed to an allergic or anaphylactic condition in the pigs dependent either on sensitivity to the causal organism or sensitivity to serum. Groups of pigs were sensitized to horse serum and to *Erysipelothrix rhusiopathiae* respectively. In the skin test, the base of the ear was found most convenient and dilutions of horse serum up to 1 : 200 were injected into 180 horse-serum-sensitized pigs. In cases of sensitivity, oedema and an inflammatory reaction quickly appeared and vanished in 20 min. The injection wheal increased in size fourfold, becoming red and then purple in colour. It was found that a positive skin reaction predominantly occurred in pigs up to ten weeks after their last sensitizing injection, while three months after the injection the reactions were predominantly negative. Anaphylactic shock was never seen in pigs negative to the skin test, but was occasionally noted in positive reactors. It was seen in 17 of 23 three-month-old pigs after S.E. immunization. It transpired that at the age of eight weeks these pigs had been given paratyphoid anti-serum prepared in horses.

An attempt was made to demonstrate a placental transmission of serum sickness by inoculating pregnant sows with horse serum and testing the skin reactions of the farrows at three weeks of age. In one group the farrows were skin sensitive and they also developed anaphylactic shock. This was not the case with the other groups. There is discussion on the duration of passive immunity in the normal and allergic animal.

The technique for the bacteriological demonstration of *Erysipelothrix rhusiopathiae* in the blood is described. Two drops of suspect blood from an ear vein were sown into horse-

flesh peptone broth to which a few drops of carbolized S.E. immune serum had been added; after 18 hours' incubation colonies could readily be detected growing under a fibrin clot at the top of the tube. Blood cultures were made from 100 pigs that had been infected artificially. Fifty-three pigs developed acute S.E. Routes of infection in order of successful development of the disease were intramuscular, oral, intraperitoneal, intravenous, and intradermal. It was found difficult to infect healthy pigs under three months old, and easy to infect ascarid-infested and vitamin-deficient pigs of that age. After infection and the subsequent rise in temperature (24 hours), blood culture gave negative results until after the temperature had dropped and the secondary febrile reaction had begun (between the second and fourth day). Pigs given immune serum early in the infection at the rate of 1 ml. per kg. body weight recovered, though the temperature remained elevated for 2–3 days. The causal organism could not be isolated from serum-treated pigs. Four of the 100 pigs died before serum could be administered.

In the remaining 96 reinfection was carried out for the purpose of determining allergy. Skin tests were carried out using broth filtrates from a ten-day-old growth drawn through a Seitz filter and heated to 100°C. Skin reaction was at a maximum within 18–48 hours, extending to possible necrosis on the fourth day in allergic animals. In those pigs not sickened by repeated injections, large intravenous injections of organisms had no effect, there being no allergic response, and no positive blood culture. But it was found that repeated inoculations could set up arthritis, endocarditis, and skin necrosis. It was considered that these complications were allergic manifestations.

In conclusion, M. in consideration of statistical evidence states that inoculation against S.E. should be finished before warm weather begins and that pigs under three months old should not be inoculated. Inoculation of breeding sows is not indicated especially, as this may result in a sensitivity transmitted to the offspring which may only come to light when the latter are inoculated. Serum vaccine inoculation is recommended especially as, if serum alone is used, protective use of serum at a later date may induce anaphylaxis or allergic manifestation. Unnecessary use of serum is to be avoided and serum should not be used for non-specific therapy. Serum sickness could be avoided by utilizing sera prepared from alternative species instead of horse serum throughout. Allergy in swine fever is also discussed but is very rare and of little consequence.

There is a comprehensive bibliography.

—D. L. Robarts.

McCarter, J. R., Hastings, E. G., & Beach, B. A. (1940). **The Sensitization of Cattle to Mammalian Tuberculin by an Avirulent Strain of Avian Tubercle Bacillus.**—*J. Amer. vet. med. Ass.* **96.** 52–55.

An avirulent strain of avian type tubercle bacillus was isolated from the pooled lymph nodes of a cow which had reacted to mammalian tuberculin. No lesions were found on P.M. examination, and the herd from which the cow was obtained was regarded as TB.-free. The strain grew well on glycerin-egg medium. Intravenous inoculation of rabbits produced lesions typical of avian TB.; the strain was not pathogenic for fowls, although one bird out of five was sensitized to avian tuberculin. By the precipitin test, the tuberculin protein of this strain was identical with the tuberculin proteins of virulent avian bacilli.

Subcutaneous inoculation of the culture into two calves rendered them sensitive to both avian and mammalian tuberculins. On P.M. examination the infection was seen to be localized in both calves to the lymph nodes adjacent to the site of inoculation; tubercle bacilli could not be recovered from either animal.—E. C. Hulse.

Spears, H. N., & Dobson, N. (1941). **The Avian Tuberculin Test and its Specificity.** —*Vet. Rec.* **53.** 365–370.

The authors' investigations show that most birds which react to the test are diseased, but that many doubtful reactors and many of those which give no reaction may prove to be infected at P.M. examination. Of 396 birds tested, 335 reacted and of these 94·3% showed visible lesions or presented other evidence of infection when examined P.M. The remaining 5·7% of the reactors failed to reveal P.M. evidence of TB. Of 18 doubtful reactors, all but four showed evidence of infection. This suggests that in practice it is advisable to treat all doubtful reactors as infected. The most undesirable feature of the test was its failure

to detect TB. in about 10% of cases in which infection was generalized although the birds remained in good condition. Out of 43 birds which were negative to the test, 20 were shown P.M. to be tuberculous.

All the birds were injected intradermally into the tip of the wattle with synthetic medium tuberculin and the results read in 48 hours.

—GWILYM O. DAVIES.

JONES, L. R. (1940). **Tuberculin Reactions. A Comparison of Reactions to Standard and Increased Initial Doses of Tuberculin.**—*Amer. Rev. Tuberc.* **42.** 191–196.

CRIMM, P. D., HUDSON, G. S., & BUNN, P. A. (1940). **Tuberculin Tests. Qualitative Reactions with an Intermediate Strength of PPD in 1,000 Adults.**—*Ibid.* 209–213.

The customary dose of P.P.D. in the first Mantoux test is 0·00002 mg. in 0·1 ml., the second test using 0·005 mg. or 250 times as much. When both strengths are used simultaneously the higher one may give unduly severe reactions in a considerable proportion of cases, and both papers deal with trials using intermediate doses.

I. The percentage of reactions to a first test with 0·0001 mg. P.P.D. in about 200 American Indians was 9% higher than with 0·00002 mg., but the difference would probably have been less if the two groups compared had been more uniform. Use of the larger first dose reduced the number of cases requiring a second test dose of 0·005 mg. The areas of skin reaction to 0·0001 mg. averaged 27% broader, 20% larger, and 53% deeper than to 0·00002 mg.

II. In a series of 1,000 adults, 553 were tested with 0·00002 mg. P.P.D. in 0·1 ml., followed by a second test at intermediate concentration of 0·001 mg., *i.e.* one-fifth the usual second dose; 447 were tested simultaneously with the same two strengths. The intermediate strength reduced the number of four-plus reactors to about 5%, but maintained diagnostic efficiency. Further investigation is regarded as necessary before a single test dose can be recommended for any specific age group.

[Since the Mantoux test for the human subject, *i.e.* measurement of the reaction induced by single intradermal injection of tuberculin, is similar to that adopted for tuberculin testing of cattle it may be worth pointing out that there is a very wide difference in the dosage used for different animals. The g. pig, like the human subject, is very sensitive, while the bovine subject is relatively insensitive and requires enormously larger doses. The tuberculin used for cattle by the Bureau of Animal Industry in the U.S.A. contains about 2·0–2·5 mg. per ml. of tuberculo-protein and the single intradermal injection of 0·05 ml. into the caudal fold therefore corresponds to about 0·1 mg. of P.P.D., *i.e.* 5,000 times the human test dose, or 20 times the higher "epidemiological dose". In England the P.P.D. equivalent of the dose for official use has not yet been defined.]—H. H. GREEN.

WEIR, J. M. (1941). **Technic for Demonstrating Antibodies Against Tuberculin in Experimental Animals with Sensitized Collodion Pellets.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 47–51.

Suspensions of "collodion pellets" [finely divided particles (see CANNON & MARSHALL—*V. B.* **11.** 380.)] sensitized with tuberculin by immersion in O.T. and subsequent washing, uniformly demonstrated the presence of antibodies against tuberculin in the blood serum of rabbits which received infections of tubercle bacilli, even at a time when many of the animals failed to exhibit skin sensitivity to tuberculin. The test clearly distinguished sera of normal animals from sera of infected animals.

To check the primary experimental observations on pre- and post-vaccination sera, a set of 90 sera from other laboratory animals, mostly rabbits, was obtained without consulting the records of previous history. After completion of the "collodion pellet tests", it was learned that 12 of the sera had come from animals without known exposure to tubercle infection; all these failed to cause agglutination. Of the remaining 78, all had been exposed to tubercle bacilli or to injections of phosphatide extracts of the bacillus, and all exhibited positive reactions with suspensions of sensitized "pellets", the height of the antibody titre varying with individual sera. In contrast to these results, complement-fixation tests demonstrated the presence of complement-fixing antibodies in only 46 of the sera, and skin sensitivity was absent at the time of taking the sera in 39 cases. Data on the use of the technique with human sera are now being analysed. [The significance of this work to veterinary research is obvious, not only for detecting mammalian infections but also for avian infections and Johne's disease.]—H. H. G.

SHEPARD, C. C., JUNG, R. W., COLWELL, C. A., GUNN, F. D., & BARTH, E. A. (1941). **Complement Fixation in Tuberculous Dogs.**—*Amer. Rev. Tuberc.* **43.** 825–838.

The results of complement-fixation tests made on dogs with experimental pulmonary TB. were compared with other findings. With different antigens, a number of tests was first carried out on normal dogs. Infection was introduced in doses of (a) less than 1 mg., (b) approximately 1 mg., and (c) more than 1 mg., but the sera of dogs given the different doses showed no significant differences in average antibody level. Four methods of infection were adopted (1) with a virulent strain only, (2) by infection and reinfection with a virulent strain, (3) by BCG intravenously, and (4) by virulent infection after BCG. It was found that in previously uninfected dogs, a virulent strain produced a higher antibody titre than did BCG and that dogs which had been infected primarily and secondarily with a virulent strain showed higher titres than did dogs which had been infected primarily with BCG and secondarily with virulent strains. The difference in the titres was greatest in the first 40–60 days. A comparison between the tuberculin test and the c.-f. readings disclosed a direct relationship between the intensity of the dermal reaction and the height of antibody level.

The technique used throughout is described in detail and the results recorded on charts and graphs.—J. R. LAWSON.

CANNON, P. R. (1940). **The Functional Significance of Specific Agglutinins and Precipitins.**—*Physiol. Rev.* **20.** 89–114.

The results of an immunological survey of the question of whether specific antibodies play the same role *in vivo* as *in vitro*, confirm the view that agglutination and precipitation reactions are part of the protective physiological mechanism which maintains the integrity of the native tissue proteins by the accelerated removal from the blood or the prompt localization, near the portal of entry, of foreign proteins which have gained access to the tissues by the parenteral route. The opsonizing effect of these processes is considered to promote phagocytosis with more effective immobilization and elimination of the antigen. Actual disease due to exaggerated tissue reactions, *e.g.* in serum sickness and allergic inflammation, is held to be a result of toxicological by-products derived from quantitative variations in kind and in relative amounts of reacting antibody and antigen.

Instances are given of the failure of antitoxic therapy due to hypersensitivity to the proteins of the antiserum leading to rapid localization or elimination of the antitoxin.

The mechanism of anaphylaxis is illustrated by the assumption that the two factors which cause precipitation in the test tube interact *in vivo* to upset the cellular equilibrium, imparting thereby a cellular stimulus.—R. O. MUIR.

*LANGE, B. (1940). Die Immunität bei Tuberkulose. [**Immunity and TB.**]—*Beitr. Klin. Tuberk.* **93.** 381. [Abst. in *Amer. Rev. Tuberc.* **43.** p. 82 of absts., copied *verbatim.* Signed: R. K.]

On the basis of many years of animal experimentation and observations on humans Bruno Lange sketches the pattern of immunity in tuberculosis. His viewpoint deviates in many respects from those of Marfan, Behring, Roemer, and also from that of Ranke. The immunity of the infected organism against reinfection from without must be recognized as proven. It also is certain that specific allergy brought about by the infection influences the whole course of the tuberculous disease. In animal experiments as well as in humans the spread of small numbers of bacilli within the body calls forth evidence of an immune response, whereas that of large numbers calls for the evidence of an allergic response. The successful protection against exogenous or endogenous superinfection is certainly a noteworthy performance of the forces of specific immunity. The acquisition of the immunity is, however, dearly bought, as observations on the parallelism between the degree of the immunity and the severity of the tuberculosis show. The relatively high immunity which the tuberculous patient acquires where natural immune forces are low is of little protection to him. On the other hand, he overcomes his tuberculosis by natural powers of resistance, in spite of the fact that immunity continually decreases as healing progresses, for the course of the tuberculous process is determined not by the immunity which he has acquired from his infection but by his individual constitutional powers of resistance. Upon these depend whether he will develop joint tuberculosis, generalized miliary tuberculosis, lupus or

phthisis, whether the disease will progress, whether it will become acute, chronic or stationary. The limits of immunity to tuberculosis also define the place of vaccination against tuberculosis. This can be undertaken only with tubercle bacilli of low virulence and consequently cannot be expected to do more than delay the earliest strides of naturally virulent infection. Such a delay of the infection might have a definite advantage in earliest childhood, since later the child's natural powers of resistance increase from year to year. Great success with vaccination cannot be hoped for. It will play only a modest rôle in the fight against tuberculosis.

ANGEVINE, D. M. (1941). **A Comparison of Cutaneous Sensitization and Antibody Formation in Rabbits Immunized by Intravenous or Intradermal Injections of Indifferent or Hemolytic Streptococci and Pneumococci.**—*J. exp. Med.* **73.** 57–66.

In three experiments with a total of 93 rabbits, A. confirmed the results of SWIFT (1929) with regard to an immune type of reaction caused by an intracutaneous injection of heat-killed streptococci in rabbits prepared by repeated intravenous injections of these streptococci. Rabbits prepared by non-haemolytic streptococci were made skin-sensitive by repeated intracutaneous injection of heat-killed vaccine. Although serum agglutinins and precipitins appeared earlier in rabbits after repeated intravenous injections of heat-killed streptococci and pneumococci than after repeated intracutaneous injections, the antibody titre reached the same level in both groups after a prolonged course of injections.—R. O. MUIR.

SABIN, R. F. (1939). **Cellular Reactions to a Dye-Protein with a Concept of the Mechanism of Antibody Formation.**—*J. exp. Med.* **70.** 67–82. [Author's conclusions copied *verbatim*].

1. The use of an antigen which can be seen within cells demonstrates that one may stimulate the phagocytic cells either of the liver and spleen or of the tissues and lymph nodes to produce antibodies.

2. The appearance of antibodies in the serum correlates with the time when the dye-protein is no longer visible within the cells and with the phenomenon of a partial shedding of their surface films.

3. It is thus inferred that the cells of the reticulo-endothelial system normally produce globulin and that antibody globulin represents the synthesis of a new kind of protein under the influence of an antigen.

4. An antigen is a substance which can specifically modify the synthesis of the cytoplasm of the cells of the reticulo-endothelial system.

VAN DER SCHEER, J., LAGSDIN, J. B., & WYCKOFF, R. W. G. (1941). **Electrophoretic and Ultracentrifugal Analyses of Antipneumococcal Horse Sera.**—*J. Immunol.* **41.** 209–223.

The electrophoretic examination of a large number of antipneumococcal horse sera showed that in all but one case there was a great increase in the amount of γ globulin, in comparison with normal horse serum. The single exception showed a component migrating between the β and γ globulins which carried antibody activity as demonstrated by absorption experiments. The amount of γ globulin in the antisera afforded a rough indication of the antibody content.

Data obtained with the ultracentrifuge indicated that the antibody activity was associated solely with a heavy molecular component.
—R. A. KEKWICK.

SCHNETZLER, E. E., & HARTSELL, S. E. (1940). **Normal Bactericidins in the Sera of the Domestic Fowl.**—*Poult. Sci.* **19.** 431–434.

The bactericidal action of the sera of 30 non-reactor Rhode Island Reds and 29 White Leghorns was tested against eight strains of *Salmonella pullorum*.

It is concluded that strains of *S. pullorum* possessed varying degrees of susceptibility to the action of bactericidin, the more recently isolated strains being less susceptible.

The serum of the White Leghorns had a greater bactericidal activity than that of the Rhode Island Reds.

The conclusions appear to be based upon results of a viable count of serum-culture mixture, a single plate being used for each test.
—F. D. ASPLIN.

TODD, E. W. (1941). **The Oxygen-Labile Haemolysin or θ Toxin of *Clostridium welchii*.**—*Brit. J. exp. Path.* **22.** 172–178.

The θ toxin of *Cl. welchii* (Type A) is shown to be an oxygen-labile haemolysin, distinguishable from the α toxin by inactivation by oxidation and reactivation by reduction, neutralization by high-titred antistreptolysin O sera, neutralization of its antibody by streptolysin O, and by a negative lecitho-vitellin reaction.

Details of the immunization of horses with *Cl. welchii* toxin demonstrate the early steep rise in antistreptolysin O titre which gradually decreases as the α antitoxin increases. Neutralization tests showed that all the known oxygen-labile haemolysins, namely those of streptococci, pneumococci, *Cl. welchii* and *Cl. tetani*, are closely related serologically, although they are not identical in antigenic structure.

The haemolysins of staphylococci, *Cl. septicum*, and *Cl. oedematiens* are not reactivated by reduction, and they are not neutralized by the antibodies of the oxygen-labile haemolysins.

—J. Keppie.

Wittich, F. W. (1941). **Spontaneous Allergy (Atopy) in the Lower Animals. Seasonal Hay Fever (Fall Type) in a Dog.**—*J. Allergy*. **12.** 247–251.

A description of a case in a bitch of sensitivity to the pollen of short ragweed, giant ragweed, pigweed, Russian thistle, and prairie sage, these plants being the pollen groups causing clinical hay fever in human beings in the district (Minneapolis, Minnesota). The symptoms were sneezing, inflammation of the eyes, nasal blocking and watery discharge, accompanied by small swellings on the face and body; these swellings itched intensely. Relief was obtained by the injection of epinephrine, and before the next pollen season the animal was immunized successfully by pollen injections. Previously the symptoms had appeared regularly for a number of years, only abating when the animal was taken away from the heavily pollinated district.

PARASITES IN RELATION TO DISEASE [GENERAL]

I. Baker, D. W. (1941). **The Parasitic Hazards Encountered in Southern and Western Raised Calves and Lambs in New York.**—*Cornell Vet.* **31.** 42–44.

II. Green, H. R. (1941). **A Practitioner's Experience in the Diagnosis and Control of Parasitic Gastro-enteritis in Imported Steers.**—*Ibid.* 44–46.

I. B. refers to the old-established practice of winter feeding of Western-raised lambs and, to a lesser extent, calves in New York State for sale in local markets. Sheep losses from this practice are becoming more serious. One reason is that range lambs from the Rocky Mountains are now too few to meet the demand and more heavily parasitized lambs from the south-west are being used instead. A list of nine species of nematodes occurring in one of the latter lambs does not give individual counts, but mentions that thousands of each of these species were present and that cestodes (*Moniezia*) and ectoparasites (*Bovicola ovis* and *Melophagus ovinus*) were also present.

Calf-loss investigations which were made suggest an absence of parasite control by the breeders. Many calves arrived with heavy burdens of worms and of biting and sucking lice, and also large numbers of ticks. The ear tick (*Ornithodoros megnini*) and the winter tick (*Dermacentor albipictus*) were commonly present.

Mortality has been heavy but very difficult to assess, especially in sheep, but unthriftiness of survivors not promptly treated has been a greater cause of loss.

II. This is a report on three severe outbreaks of parasitic gastritis or gastro-enteritis in newly imported calves [see I]. In the first outbreak *Ostertagia* and *Cooperia* spp. were involved, in the second *Ostertagia* spp. were present in the fourth stomach in very large numbers, and the third was caused principally by *Haemonchus contortus*. Treatment was by 100 ml. of 1% copper sulphate and nicotine sulphate per 100 lb. body weight, repeated in ten days, and followed in seven days by 40 ml. of equal parts of tetrachlorethylene and mineral oil given immediately after 2–3 ml. of 4% copper sulphate solution had been placed in the throat.—C. V. Watkins.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Gebauer, O. (1939). Das Verhalten der grossen Dasselfliege (Hypoderma bovis, de Geer) im Tierversuch und die perkutane Invasion der Larve des ersten Stadiums. **[The Behaviour of *H. bovis* in Animal Experiments and the**

Percutaneous Penetration of First-Stage Larvae].—*Z. Parasitenk.* **11.** 391–399.

G. succeeded in raising 30 flies from 34 larvae of *H. bovis* collected as they emerged from cattle, and placed in sand covered with a layer of turf, moisture being supplied in the lower strata to imitate soil conditions. The containers were exposed to the morning sun. Pupation occurred in about 12 hours after the falling of the larvae from the cattle. The pupal stage lasted 22–31 days, the longer periods occurring when the pupae were in more shaded positions. Equal numbers of male and female flies emerged and copulation occurred within a few minutes of the sexes coming together. The flies lived for 2–8 days. Flies could not be raised from larvae removed artificially from warble boils.

The flies did not appear to be attracted by a calf brought into the insectorium, but when a female fly was placed on the feet or abdomen of the calf it commenced to climb upwards for a short distance, and then to lay eggs, the calf remaining relatively quiet. Embryos developed in the eggs in about four days, but emergence was not observed. Embryos freed artificially and placed on the human hand were observed to penetrate the skin, not through the hair follicles, but through a skin injury. It is suggested that biting flies may cause injuries through which the larvae normally penetrate. Examination of the skin of a calf on which eggs had been laid also showed that skin penetration had occurred, larvae being detected in the subcutaneous connective tissue. A description of the mouth parts of the first-stage larva is given.

—U. F. Richardson.

Baranov, N. (1939). Stand der Kolumbatscher Mückenforschung in Jugoslawien. [**The Position of Research on the Golubatz Midge** (*Danubiosimulium columbaczense*) **in Yugoslavia**].—*Z. Parasitenk.* **11.** 215–234. [See also *V. B.* **9.** 90, and **10.** 259, 590 and 765].

The Golubatz midge spreads periodically from the "Iron Gate" area of the Danube gorge over wide areas of Rumania and Yugoslavia, and in 1934 is said to have caused the deaths of over 3,500 cattle and buffaloes and nearly 7,000 sheep and goats in the latter country. B. considers that three different types of the insect occur, being mainly distinguished by the depth at which the larvae live in water, and that only the deep-living type, *profundale*, is responsible for serious extension into surrounding country, or for the poisoning of stock by bites. The annual increase in the numbers of flies, with limited extensions, does little harm, possibly because it is mostly due to the two non-toxic types, or because the local animals have acquired some immunity. At irregular intervals, however, serious extension of the infested area occurs and heavy stock mortality results. Periods when such extensions occur appear to be associated with an abnormally high temperature of the Danube water, and absence of rain and of high winds.

A description of the morphology and habits of the midges is given, and suggestions are made for their control. It is pointed out that certain species of fish live on the larvae, and that when the river water is low the eggs which are left dry by the falling water could be destroyed. Both male and female flies feed on plant juices immediately after emergence and an opportunity occurs to destroy them by means of poison baits on the plants on which they feed.

It is suggested that research into methods of control should be undertaken, and also into the nature of the toxin injected by the bite.

—U. F. Richardson.

Roy, D. N., & Ganguly, S. K. (1940). **Linguatulid Infection in Man.**—*Indian med. Gaz.* **75.** 478.

The first recorded case in the East. The subject was a woman who complained of pain over the region of the frontal sinuses. Five nymphs of *Linguatula serrata* were evacuated from the respiratory tract by coughing and sneezing. The available history of the case suggests that the infection was acquired from dogs, the definitive host of the parasite.

—S. C. A. Datta.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Schumacher, W. (1938). Untersuchungen über den Wanderungsweg und die Entwicklung von Fasciola hepatica L. im Endwirt. [**Migration of** *F. hepatica* **in the Definitive Host**].—*Z. Parasitenk.* **10.** 608–643.

Detailed experiments were performed on large numbers of g. pigs and on rabbits, while

similar investigations were carried out on nine sheep. Methods are described for the artificial infection of snails and the subsequent collection of cercarial cysts for infection experiments. 5–7 miracidia were used to infect each snail, as larger numbers caused death. Snails were kept in irrigated dishes with only a shallow layer of water over a thin layer of mud at the bottom of the dish. Under optimum conditions in autumn and winter snail mortality was low, but it rose to as much as 73% in summer. At a temperature of 25°C., cercariae emerged about five weeks after infection of the snail. Shortly before this time the snails were placed in dishes to whose sides blades of grass had been attached with gelatin. As many as 1,000 cysts could be collected in this way on a blade of grass 15 cm. long.

Definite numbers of cysts were fed to the host animals which were then killed at intervals after infection. S. examined washed sediments from the various sections of the alimentary tract, from a citrated blood sample from the portal vein, from saline washings from the abdominal cavity and surfaces of the organs, from the gall bladder and main bile ducts, and from sieved washings of the minced-up liver.

In the g. pig the cyst began to lose its wall about half an hour after ingestion. The larva bored through the gut wall and appeared in the abdominal cavity after about two hours. About 24 hours after infection most of the flukes were collected in the abdomen and they began to bore into the liver after 48 hours. After 4–6 days only a few parasites were found in the abdominal cavity. At about seven weeks the young flukes were found in the main bile ducts.

Studies in sheep tended to confirm these findings. Most of the flukes could be found in the abdomen 48 hours after infection and were found in the main bile ducts from eight weeks onwards. [MONTGOMERIE (1928) showed that eggs began to be passed, at the earliest, ten weeks after infestation.]

Young flukes could not be detected in the portal vein and their passage by this route must be regarded as only occasional and accidental.

—H. E. HARBOUR.

SCHWARTZ, B. (1941). **Meat-Inspection Aspects of Trichinosis.**—*J. Amer. vet. med. Ass.* **98.** 458–461.

S. notes that routine microscopic inspection of pig carcasses cannot give complete protection from trichinosis, since parasites may be absent from particular samples examined; such inspection tends to create a false sense of security in persons who like to eat raw pork. Moreover, inspection is limited to enterprises engaged in inter-state or foreign commerce. Pigs slaughtered under Federal inspection amount annually to about 40 million or 60% of the total number of swine killed in the U.S.A. At an estimated cost of about 25 cents per pig for microscopic examination which at best is only partially effective, the drain on the public treasury hardly appears to be warranted. Certain procedures which have been approved for use in meat-packing establishments operating under Federal inspection give a full measure of protection to the consumer of raw pork products. These procedures are :– (1) heating so that all parts of the product attain a temperature of not less than 137°F., (2) special refrigeration at a temperature not higher than 5°F. for a continuous period of not less than 20 days or at lower temperatures for shorter specified periods, and (3) special curing methods based on empirical formulae at specified temperatures for definite periods.—J. N. OLDHAM.

JOLLY, R. H. H. (1941). **Trichiniasis in the West Midlands.**—*Publ. Hlth, Lond.* **54.** 88–91.

J. outlines the administrative action taken by the Public Health Department to limit the spread of the Wolverhampton outbreak of trichinosis in 1940 [see *V. B.* **11.** 698 and 774.] and to discover, if possible, the source of the infection. Commenting upon the effects of physical agents on trichinae as described by other observers, J. points out that, in the modern rapid method of curing bacon by pickling for only 10–14 days, there appears to be considerable risk of such bacon conveying infection unless it is properly cooked before consumption. In a discussion on the eradication of this disease, it is pointed out that although the regulations in this country require all swill to be boiled before being fed to pigs, this does not remove the possibility of rats gaining access to the swill before it is cooked and of setting up and maintaining a focus of infection on the pig farm.—J. N. OLDHAM.

SCHMIDT, H. W. (1941). Trichinenübertragung durch Fuchs und Dachs unterbinden. [**Foxes and Badgers Concerned in the Transmission of Trichinosis**].—*Tierärztl. Rdsch.* **47.** 311–314.

S. points out that meat inspection for trichinosis in Germany has been successful in reduction of the incidence to a low level, but not in complete eradication. Since 4% of wild foxes have been found to be infected (an incidence 100,000 times that in domestic swine) and badgers also show a high incidence, S. believes these animals to be the main reservoirs of infection. He describes the many ways in which trichinous carcasses of these animals can set up new cycles of infection, and points out that veterinarians are best able to advise farmers, hunters, fur breeders, etc. on the precautions necessary to control the spread of the disease.—E. S.

MATOFF, K. (1938). Ueber das Vorkommen von *Schwartziella nodulosa* (Schwartz, 1928) in bulgarischen Buffeln. [*Cooperia nodulosa* **in Bulgarian Buffaloes**].—*Z. Parasitenk.* **10.** 329–339.

Statistics from the abattoirs of Tirnovo, Gorna-Orechowitza, and Sofia show that the intestinal mucosae of 88% of cattle and nearly 100% of buffaloes contain nodules of this worm. As many as 500 or more nodules may be found in the intestine of a single animal and 50–200 are commonly found. M. describes the various forms taken by the nodules, the majority being rounded and about the size of a pea. In one case numerous specimens of the worm were found free in the lumen of the gut, while degenerating nodules were found in the walls. M. suggests that the worms develop in the intestinal wall up to the late autumn and then break out into the lumen to complete development. [The evidence on which this view is based appears to be derived from a single case only.]

A few of the medium- and large-sized greenish caseous nodules each contained an immature larva 2–3 mm. long. The majority of the nodules in the buffalo, however, contained well developed, sexually mature trichostrongyles which are described in detail and identified as *Schwartziella* [=*Cooperia*] *nodulosa*. Certain variations noted from the original descriptions of SCHWARTZ are :– (1) presence of cervical and pre-bursal papillae in the male, and of cervical and caudal papillae in the female, (2) depressions or notches in the edges of the spicules, and (3) that the externo-dorsal rays branch off symmetrically from the same stem as the dorsal ray at points equidistant from the branching of the symmetrical lateral sub-branches of the dorsal ray.

M. considers that the variations which he describes are not sufficient to warrant the classification of the worm as a distinct species or even as a distinct variety of *C. nodulosa*.

—H. E. HARBOUR.

PINTO, C. (1938). Sobre os gêneros "Bunostomum" Railliet, 1902 e "Bustomum" Lane, 1917. (Nematoda-Ancylostomidae). [**Study of the Genus** *Bunostomum*].—*Rev. Fac. Med. vet. S. Paulo.* **1.** 1–17.

P. compares *B. trigonocephalum*, the type species, with *B. phlebotomum* and attempts to resurrect the genus *Bustomum* for the latter. [The characters used for differentiation of the two genera seem to be of species rank only.]

—E. S.

STROH, G. (1940). Zum Bau der männlichen Wurmenden von Dictyocaulus filaria und D. viviparus. [**The Structure of the Bursa of the Male in** *D. filaria* **and** *D. viviparus*].—*Berl. Münch. tierärztl. Wschr.* Aug. 30th. 422–423.

S. gives photomicrographs of lateral and ventral views of the bursae of these two species, placed side by side for comparison and enlarged to the same degree. The greater width of *D. filaria* is apparent, and the fused mediolateral and postero-lateral ray of the bursa is seen not to have the common trunk with the externo-dorsal ray which was figured in FIEBIGER's "Tierische Parasiten" [(1936). Berlin : Urban & Schwarzenberg. (3rd Edit.)]. In *D. viviparus*, the externo-lateral and externo-dorsal rays alone are seen to have swollen tips.

—E. S.

DISEASES, GENERAL

MINETT, F. C. (1940). **The Control of Animal Disease in India.**—*Indian Fmg.* **1.** 475–478.

M. gives an account of the differences, apparent to the veterinarian newly arrived in India, between veterinary work in Europe and that in the East. He notes how dissimilar are the prevailing diseases, the chief causes for this being the contrasting conditions under which animals are maintained, climatic factors, with

their effect upon available fodder, and the lack of proper hygiene. Especially to be deplored are the absence of veterinary police measures and of quarantine regulations in India and the hampering effect of religious scruples upon progress, particularly when these result in hopeless cattle over-population and the consequent heavy strain on the stock-carrying capacity of land.—L. H. SHIRLAW.

SCHAAF, J. (1941). Zur Epizootologie und Bekämpfung der Tierseuchen im früheren Polen. [**Epizoology and Control of Animal Diseases in the Former Republic of Poland**].—*Berl. Münch. tierärztl. Wschr.* June 27th. 309–313.

This article is complementary to a previous one [*V. B.* **11.** 879.] and is concerned with other notifiable diseases. S. gives statistics for the years 1935–38 inclusive and discusses features of importance.

Anthrax was common in Poland, particularly in the south-east where there were 191 infected localities in Tarnopol province in 1938. The relatively heavy ground infection is ascribed to the flat, well watered land, to the practice of open-air grazing for cattle between April and November, and to faulty measures for destroying anthrax carcasses. The Poles used to vaccinate their horses, cattle, and sheep by the intradermal method, using Pasteur's first vaccine for horses and cattle and Pasteur's second vaccine for sheep.

Blackleg had a geographical distribution similar to that of anthrax, Stanislau province in the extreme south being most heavily infected (256 infected localities in 1938). Control was effected by vaccination with formalin-killed culture.

Haemorrhagic septicaemia was very prevalent in Warsaw province (109 infected localities in 1938, but 390 in 1937), but not elsewhere. No control by vaccination was attempted.

Foot and mouth disease reached Poland from the west in December 1937 and attained its maximum in August 1938 when 232,558 localities were infected. In 1939 it was regressing. It took a mild course throughout. No immunization was carried out.

Swine erysipelas was most prevalent in the extreme north (Vilna province), where 2,681 localities were infected in 1938. Immunization was carried out to a limited extent, by means of killed culture and antiserum, a method condemned by S. as scientifically faulty and unprofitable. The Germans are now using live culture plus antiserum.—J. E.

CARPANO, M. (1939). Sulle principali malattie infettive ed infestive degli animali domestici in Albania in rapporto anche a quelle transmissibili all'uomo. [**Principal Infective Diseases and Infestations of Domestic Animals in Albania with Reference to those Transmissible to Man**]. —*Azione vet.* **8.** 513–516, 536–539, 558–560 and 628–633.

This article gives an account of the diseases encountered in a survey of stock conditions in Albania carried out during the preceding two years. Albania was mainly an exporting country as regards stock and is isolated from the rest of the Balkan peninsula; the major epizootic diseases such as rinderpest, contagious pleuro-pneumonia of cattle and goats, sheep pox, swine fever, and contagious abortion of cattle, although prevalent at one time, seemed to have disappeared.

Diseases of importance included in 1939 the following. TB. occurred in cattle and buffaloes, but only about 1% of ranch cattle were infected. In stabled animals, particularly imported cattle, the infection rate might reach 30%. In poultry, sporadic cases of TB. occurred which were difficult to explain. It was suggested they might originate from human infection. Johne's disease had been detected only in slaughtered animals. Glanders was thought to have died out, but positive reactions to the mallein test were encountered, and it was thought that the disease occurred in local animals in a latent, non-clinical form. Attempts to isolate brucella from cases of bovine abortion had been unsuccessful, but undulant fever occurred in human beings, and positive agglutination tests had been obtained in goats. Outbreaks of fowl cholera occurred from time to time, but pasteurella infection of buffaloes appeared to be very rare, though in other countries these animals are very susceptible. Paratyphoid infections had been encountered in large and small ruminants and in chickens, but attempts to isolate *Salmonella pullorum* had been unsuccessful. Anthrax was relatively prevalent, cases probably resulting from pasture contamination. Anaerobic infections of ruminants had also come under observation. The common piroplasmal infections occurred in cattle, horses, sheep, and dogs and theileriasis and anaplasmosis also occurred but in local animals did not

cause serious disease. *Aegyptianella* and spirochaetal infections occurred in fowls, and bartonella, grahamella, and eperythrozoon infections in ruminants. Human leishmaniasis existed but the occurrence of canine infection had not been proved, though many dogs showed the clinical symptoms of the disease.

Occasional outbreaks of foot and mouth disease occurred, but the disease was mild in local animals, and did not appear to be very contagious. Sheep pox which was prevalent at one time seemed to have died out, whilst rabies in dogs was uncommon, although one or two serious outbreaks had been recorded in wolves. A form of paralysis had been encountered in fowls, and contagious agalactia was a serious disease of sheep and goats.

Helminthic infections were considered to cause severe mortality, their prevalence being favoured by the contamination of water supplies and general unhygienic conditions. Liver fluke in sheep, parasitic gastritis, and parasitic broncho-pneumonia were prevalent, whilst *Cysticercus bovis*, *C. cellulosae*, and hydatid infestation were also widespread.

—U. F. Richardson.

Gerlach. (1940). Neue Möglichkeiten einer wirksamen Bekämpfung von Tuberkulose und Abortus Bang. **[New Possibilities of an Effective Control of TB. and Bovine Brucellosis]**.—*Berl. Münch. tierärztl. Wschr.* Dec. 27th. 621–624.

The essence of G.'s idea is to found a vast new livestock province in the newly won *Ostgebieten* [mostly Polish territory] placing there a new population of German settlers and supplying them with young cattle raised on State farms in the new area. These cattle would be obtained in the first place as young calves from Germany proper. They would be repeatedly tested for TB. and brucellosis. Thus Germany would acquire an additional farm territory maintained free from these diseases. [The problem of eradicating them from herds in Germany proper seems to have been ignored or regarded as insoluble].—J. E.

Jones, T. C. (1940). **The Relation of Brucellosis to Periodic Ophthalmia in Equidae.** —*Amer. J. vet. Res.* **1.** 54–57.

Sera from 95 horses affected with periodic ophthalmia and 187 healthy horses of various ages were submitted to agglutination tests for *Br. abortus* infection, but reactions did not occur in serum dilutions high enough to be of any diagnostic significance. Approximately 90% of both affected and healthy groups had titres of 1 : 80 or less.

Complete cultural examinations of various organs of the body were made of 27 cases autopsied, but in no case were brucella organisms found. In six cases organ suspensions were injected into g. pigs, but these also gave negative results.

Organisms of the genus *Listerella* were isolated from 14 of the 27 cases, but the significance of these organisms has not been established.—Gwilym O. Davies.

Kernkamp, H. C. H. (1941). **Diseases of New-Born and Suckling Pigs.**—*Lederle vet. Bull.* **10.** 81–86.

A review of some of the conditions which, in K.'s experience, are responsible for losses in pigs up to the time of weaning. A survey conducted by the Minnesota Agricultural Experiment Station showed that, of the piglets farrowed by 518 brood sows, 24·1% died before 60 days of age. Of 2,320 cases which were studied in an endeavour to ascertain the cause of death, 35% succumbed during the first 5–7 days of life.

The most important original observations are those dealing with two conditions which K. terms "myoclonia congenita" and "alimentary toxaemia" respectively. The former, which has been variously designated as "trembles", "dancing pigs", etc. is characterized from birth by clonic muscular spasms, and affects usually all the pigs in a litter. If the head and neck muscles are involved, death may result from inability to suck, but in most cases recovery occurs spontaneously after 3–6 weeks. The condition occurs more frequently in gilt litters than in those of adult sows, but no nutritional or genetical explanation has yet been found. "Alimentary toxaemia" refers to an acute and usually fatal disease which appears to be on the increase. It occurs in winter or spring only, and is more frequent in gilt litters. The clinical picture is usually quite definite, beginning with a disinclination to suck and passing to semi-coma and evidence of abdominal distress. Dehydration is common, although a mild anasarca appears in some cases. Rectal temperatures are usually subnormal.

—Alastair N. Worden.

Beaudette, F. R. (1938). **Differential Diagnosis of Respiratory Diseases of Poultry.** —*J. Amer. vet. med. Ass.* **92.** 389–402.

Only an outline of this interesting paper can be given. B. explains how several diseases of the respiratory tract can be diagnosed by P.M. examination, bacteriological studies, and animal inoculation, but there still remain the difficulties of differentiating diseases showing rhinitis, sinusitis, conjunctivitis, or any combination of these with or without a mild tracheitis. Such affections may be laryngotracheitis, bronchitis, or the type of coryza which is not associated with the coryza bacillus (probably a species of *Haemophilus*). B. states that the methods available depend on the number of specimens received for diagnosis, whether alive or dead, the laboratory facilities, and the time available. Methods used may be (a) cross-immunity tests, (b) neutralization tests in birds or embryonated eggs, (c) a combination of (a) and (b), or (d) cultivation experiments in embryonated eggs. Where dead birds are received and the diagnosis is urgently required cross-immunity tests are preferred, virus from the specimen being injected into birds known to be immune to bronchitis and laryngotracheitis. Alternatively, unknown virus from the birds may be injected with known immune serum into healthy birds. If the birds sent in are survivors, the procedure may be reversed. Neutralization tests in embryonated eggs have not been used to any appreciable extent, and H. gives details of cases in which this method was tried. In each case the bird presented for diagnosis was allowed to recover and then bled to provide serum for the tests. The results suggest that this method has possibilities but time is required. The final method, namely cultivation in eggs, has certain definite advantages. The viruses of bronchitis and laryngotracheitis are ready distinguished by this method and routine diagnosis is simplified. The possibility of confusing cross-infections occurring in animal houses is also avoided.

—Gwilym O. Davies.

Muckenfuss, R. S. (1941). **Epidemic Encephalitis.**—*Bull. N.Y. Acad. Med.* **17.** 487–499.

A general review of encephalitis infections in man, including human infection with Eastern and Western types equine encephalomyelitis, but giving no new information on the subject.

Cohrs, P. (1941). Die Erschöpfung des Pferdes. (Zugleich ein Beitrag zur Differentialdiagnose der infektiösen Anämie.) Erste kriegspathologische Mitteilung. **[Exhaustion in the Horse. Differential Diagnosis from Equine Infectious Anaemia].**—*Dtsch. tierärztl. Wschr.* **49.** 277–281.

This is the first of a series of studies on "war pathology" and deals with "exhaustion" in 23 army horses employed during the campaigns in Poland and on the western front. All the animals were in poor condition and they died either during transit to the Hanover veterinary school or within a few days of arrival. In 11 horses there was no obvious primary pathological condition to account for death, which was presumably directly due to excessive physical strain under conditions of poor nutrition. In all the animals the main findings at autopsy were emaciation, poor coat, inelastic skin, sunken eyes, and pronounced anaemia of mucous membranes and all organs and tissues.

The changes in the internal organs are dealt with in detail and the differential diagnosis from E.I.A. is considered. The histological changes included serous atrophy of adipose tissue around the kidneys, heart, mediastinum, and in the bone marrow, as well as involution of the lymphatic tissue throughout the body. Haemosiderin was deposited in large amounts in spleen, bone marrow, and liver.

The factors producing "exhaustion" comprise a diet inadequate in relation to the extreme physical exhaustion of *Blitzkrieg* campaigns, as well as the toxic effect of residual lesions of strangles and infectious bronchopneumonia. Age and constitution are probably also important predisposing factors.—E. G. W.

Flatten, W. (1941). Ein Beitrag zur Bekämpfung und Behandlung der Fohlenlähme mit polybakteriellen Impfstoffen. **[Control and Treatment of Joint-Ill with Polybacterial Vaccines].**—*Berl. Münch. tierärztl. Wschr.* Feb. 28th. 103–104.

F. decided to test the effect of a polyvalent vaccine and serum for joint-ill in foals by using *Salmonella abortus-equi*, *Bacterium equirulis*, strains of streptococci and coliform organisms isolated from typical cases.

He states that, by injecting 10 ml. and 20 ml. of such a vaccine subcutaneously into mares during the 5th and 7th months respectively of pregnancy, a high degree of immunity to infection was produced. If the mares were

exposed to infection or actually infected, 20 and 90 ml. of serum, given at similar periods during gestation, produced beneficial results. Again, whether actual infection occurs or not, or if there is localized infection of the udder, uterus, or vagina, F. favours the subcutaneous injection of 100 ml. of serum in the last month of pregnancy as a routine measure for all mares.

He emphasizes the importance of the colostrum to the foal and advocates simultaneous doses of 30 ml. of serum and 10 ml. of vaccine given subcutaneously during the first 24 hours of life, and for foals which develop lameness with swollen joints, local treatment with antiphlogistin or similar preparations together with 50–100 ml. of serum.

—N. S. Barron.

Pfandler. (1941). Stomatitis diphtheroidea bei Pferden. **[Diphtheritic Stomatitis in Horses]**.—*Dtsch. tierärztl. Wschr.* **49.** 282–283.

In a base hospital and two remount depots in Germany 150 horses became affected with acute dermatitis of the skin around the mouth and nostrils and of the mucous membrane of the lips. The skin lesions consisted of scabby crust formation and the mucosal lesions of grey-white diphtheritic tissue covering plaques, which could be easily removed, leaving a bright red mucous membrane surface without erosions except in the most severe cases. The lesions were very tender and there was intense salivation. The general bodily condition was not disturbed.

Spontaneous resolution occurred in 3–14 days in all cases and the only sequel was the appearance of depigmented spots on the lips.

The disease was evidently associated with a sudden change to very mouldy and dusty hay, in which no prickly matter could be found. No causal organism could be incriminated.—J. E.

Wyssmann, E. (1941). Klinische Beobachtungen über Entzündungen der retropharyngealen Lymphdrüsen beim Rind. **[Clinical Observations on Inflammation of the Retropharyngeal Lymph Nodes of Cattle]**.—*Schweiz. Arch. Tierheilk.* **83.** 199–211.

W. describes, with especial reference to the clinical findings, 184 cases of lymphadenitis of the retropharyngeal nodes in cattle. The condition was most common in cows (108 cases), less so in oxen and calves (66 cases), and rare in young breeding animals (9 cases). The work is based on observations made during the years 1903–32 when W. was in practice.

The most constant clinical symptom is disturbed respiration which may amount in some cases to extreme dyspnoea. The animal may make a rattling noise which is more pronounced during feeding or exercise or if pressure is exerted over the pharynx or larynx. In some cases the animal breathes through the open mouth and there is danger of asphyxia. Acute swelling of the pharyngeal region may occur, usually more marked on one side, and the head is held extended. There is often a dry cough and particles of food may be mixed with the mucoid nasal discharge. Auscultation of the lungs is difficult owing to the rattling and snoring.

In acute cases there may be general symptoms, whilst chronic cases lead to rapid loss of condition. Occasionally the infected lymph nodes rupture into the pharynx and rapid recovery occurs; aspiration pneumonia was not observed. Rupture of the infected nodes is rare in cases of tuberculous infection and is more likely when the causal organism is one of the pyogenic bacteria. Compression of the larynx and pharynx due to lymphadenitis is due to TB. in 80% of cases (quoted from Götze). Differential diagnosis includes:– tuberculous and actinomycotic laryngitis, acute pharyngitis, parotitis, and inflammatory or neoplastic masses of tissue in the pharynx.

Recovery is not uncommon even if the condition is tuberculous. W. recommends the local application of ointments containing cantharides (which may be combined with croton oil), or a strong liniment, and states that potassium iodide, 3–6 g. daily, should be given in the drinking water.

Six representative cases are described in detail.—E. G. White.

Celan, B. (1939). Contribuţiuni la studiul hematuriei esenţiale a bovideelor. **[Chronic Haematuria of Bovines]**.—*Rev. Med. vet., Bucureşti.* **51.** 617–626.

C. discusses the various theories on the aetiology of chronic haematuria of bovines and describes several cases of the disease. The onset was sudden and the disease usually ran a chronic course. Apart from the well known symptoms of haematuria and oedema and the usual haemorrhagic and papillomatous lesions in the urinary bladder, C. mentions hyperaemia

of the renal glomeruli, and occasional hypertrophy of the sublumbar lymph nodes. Microscopically he found considerable lymphocytic infiltration around the bladder lesions. In two cases epitheliomas with metastatic growths in the l.nn. were found. In two cases cysts containing an opalescent fluid were found on the external surface of the bladder and in these same animals the vagina showed petechiae and small papillomas similar to those found in the bladder.

Nothing new regarding the aetiology of the disease is contributed.—MILLER WATSON.

I. BEVERIDGE, W. I. B. (1941). **Foot-Rot in Sheep: A Transmissible Disease due to Infection with *Fusiformis nodosus* (n. sp.). Studies on Its Cause, Epidemiology, and Control.**—*Bull. Coun. sci. industr. Res. Aust.* No. 140. pp. 1–53.

II. BEVERIDGE, W. I. B., & GREGORY, T. S. (1941). **Field Trials on Eradication of Foot-Rot.**—*Ibid.* pp. 54–56.

I. Investigations resulting in the discovery of the cause of foot-rot and a relatively simple means of controlling the disease are fully described for the first time in this monograph.

Foot-rot is defined as a contagious disease of the sheep's foot, characterized by separation of a large portion of the hoof from the soft tissues due to a spreading infection immediately beneath the horn. The active lesions are mainly in the epithelium beneath the horn and the rete mucosum is not ordinarily destroyed. Diagnosis can be made on clinical grounds where large numbers are affected, but, where doubt exists, detection of the causal organisms in smears differentiates foot-rot from certain other foot affections with which there has been much confusion in the past.

In Australia, foot-rot is confined to the better rainfall areas in the southern portion of the continent, but for some reason it is absent from the southern tablelands. Its incidence is largely determined by seasonal conditions, being highest on lush pasture. One possible predisposing factor is percutaneous infection with larvae of *Strongyloides papillosus*. The disease can be readily transmitted by inoculation of material from lesions on to scarified skin between the digits, but no similar lesions can be produced in the absence of the specific infection.

Previous claims that *Fusiformis necrophorus* or *Treponema podovis* cause foot-rot are refuted. Lesions contain a large variety of bacteria including many cocci. At the junction of the healthy tissue, an atypical spirochaete, *Spirochaeta penortha*, and a motile fusiform organism usually predominate. *S. penortha* was eventually grown by surface cultures. This spirochaete ordinarily has no waves, but these can usually be made to appear by heating the smear in strong carbol fuchsin. The fusiform organism is a Gram-negative rod of average size which differs from previously described fusiform organisms in being frankly motile. Neither of these organisms causes foot-rot on inoculation.

Further search revealed another organism which B. has designated *F. nodosus*, which is present in small numbers. This is a large, Gram-negative, non-motile, non-sporing, anaerobic bacillus which usually has enlargements at both ends. Growth on plate culture was obtained only in the presence of horse serum, though some batches of horse serum failed to promote growth. The addition of sheep serum not only failed to promote growth but inhibited it in the presence of horse serum. Growth was further enhanced by the presence of CO_2 and of cysteine, and by the use of "V-F." agar media [see TURNER—*V. B.* **1.** 35]. Surface colonies etch themselves into horse-serum agar plates.

Inoculation of the scarified interdigital skin of the sheep's foot with cultures of *F. nodosus* results in typical lesions of foot-rot although they are less severe than in the natural disease. Simultaneous inoculation with *F. nodosus* and *S. penortha* produces foot-rot which is indistinguishable from the natural disease. The addition of the motile fusiform to the inoculum is without effect; when not inoculated it soon enters the lesions from the environment. *S. penortha* does not appear to be present in the normal environment.

B. concludes that *F. nodosus* is the primary causal agent of foot-rot and that very probably *S. penortha* is a "specific, accessory causal agent". The motile fusiform is regarded as a constant secondary invader but as possibly playing some part in the pathogenesis of the disease. Further, the aerobic bacteria in the lesions probably play a part by aiding the survival of these three non-sporing anaerobes, which withstand exposure to air longer in the presence of aerobes than in pure cultures.

These investigations were carried out in

Australia. Subsequently B. studied cases of foot-rot in New Jersey while visiting the U.S.A. and was able to confirm his observations. An American and an Australian strain of *F. nodosus* were found to be serologically related. Smears from foot-rot lesions in England and in New Zealand also contained *F. nodosus*, *S. penortha*, and an organism of identical appearance to the motile fusiform one.

No evidence could be found that *F. nodosus* occurs elsewhere than in the feet of sheep showing some lesions. In this situation it may persist for years. Experiments showed that, apart from lesions, it cannot survive in nature more than a few days. A scheme is elaborated for eradicating foot-rot by removing all animals carrying the infection. Carrier animals can be detected by visual examination aided by paring of the horn where necessary. In most districts in Australia this is best done during the summer when the disease is quiescent. The feet should be examined for lesions and affected and carrier animals removed. Where the grass remains green during the summer and foot-rot may spread, the pasture should be left unstocked for one or two weeks for decontamination before healthy animals are returned to it.

II. Large-scale field trials have been conducted to test the suggested method of eradication. Unaffected sheep placed on irrigated pasture two weeks after the removal of a heavily infected flock remained free of the disease during 22 months' observation. Uninfected sheep remained healthy when isolated in a decontaminated paddock on a station where foot-rot was prevalent in the general flock. Foot-rot was eradicated from four stations, each carrying 12,000–30,000 sheep, and the flocks remained free of the disease during a subsequent wet season when it was prevalent on neighbouring properties.

Brown, G. L., & Harvey, A. M. (1939). **Congenital Myotonia in the Goat.**—*Brain.* **62.** 341–363.

Congenital myotonia in goats is similar to Thomsen's disease in man, in that the characteristic symptom (intensified after sudden muscular exertion) in both conditions is the involuntary persistance of voluntary contraction. By means of myographic and electromyographic methods the authors investigated the possibility of the central nervous system's being involved in the pathogenesis of the disease. The muscles of affected animals are abnormally sensitive to various forms of mechanical stimulation and to potassium ions. This sensitivity remains unchanged after section and degeneration of the nerve and after full curarization of the muscle, but it is abolished by a suitable dose of quinine. It is clearly proved that the condition is due to an abnormality in the muscle fibre itself and not to any involvement of the neuro-muscular mechanism.

[For preliminary account of the investigation and for a further description of the condition, readers should see *V. B.* **10.** 277 and 42 respectively.]—J. R. Lawson.

Seifried, O. (1941). Osteomyelosklerose der Hühner und die dabei auftretenden Veränderungen der blutbereitenden Organe. **[Osteomyelosclerosis of Hens and the Resultant Changes in the Blood-Forming Organs].**—*Berl. Münch. tierärztl. Wschr.* March 14th. 126–127.

This condition was first described in the fowl by Seifried & Sassenhoff [(1940). *Arch. wiss. prakt. Tierheilk.* **75.** 411—journal not received] and is probably identical with osteomyelosclerosis as seen in man. It differs from all the other bone diseases of domestic animals and does not produce any alteration in the external appearance of the bones. The condition was recognized in about 30% of 200 fowls of various breeds from a number of different flocks. The affected bones are heavier than normal, the specific gravity is raised, and the cancellated bone is enormously increased in amount, the compacta being normal. New spongy bone is deposited on existing trabeculae and much new cancellous bone is formed which gradually fills the normal marrow spaces. The whole skeleton is usually affected. The haemopoietic tissue is reduced in amount and in advanced cases the bone marrow is almost entirely displaced and the small spaces between the newly formed trabeculae are occupied only by a reticular tissue containing very few cells. The spleen and liver often show changes suggestive of myeloid leucosis; this may be in the nature of a metaplasia of myeloid tissue due to the diminished myelopoiesis in the bone marrow. The blood picture shows anaemia and leucopenia. An excess of calcium phosphate in the diet is tentatively suggested as a possible cause of the condition.—E. G. White.

Jungherr, E., & Levine, J. M. (1941). **The**

Pathology of So-Called Pullet Disease. —*Amer. J. vet. Res.* **2.** 261–271.

This paper is mainly concerned with a detailed study of the morbid histology of a disease of unknown aetiology affecting young laying birds, 5–7 months old. The disease is stated to occur primarily in the North Atlantic and North Central states of the U.S.A.; it has a seasonal incidence, the majority of cases being met with during the warm months, June-November. The disease shows great variability in symptoms and pathological features, but is characterized by a sudden drop in egg production, droopiness, cyanosis, dehydration, diarrhoea or constipation, and occasionally pyrexia. In affected flocks the morbidity ranged from 0·1–100%, and the mortality from 0·2–53·3%. The more important pathological features were focal necrosis of the liver, multiple petechiation of serous surfaces, enlargement and apparent injury of the islets of Langerhans, patchy muscular dystrophy, and nephrotic changes in the glomeruli and tubuli of the kidneys. Examination of the blood constituents of affected birds showed hyperglycaemia, high non-protein nitrogen and high uric acid, and hypocalcaemia; these findings were suggestive of uraemia. Cultural and transmission experiments failed to demonstrate an infective agent. Experimental production of renal gout in birds by injection of small doses of potassium dichromate was associated with cyanosis and microscopic liver and muscle lesions, a picture stated by the authors to be not unlike that of the spontaneous syndrome. The authors conclude that "pullet disease" resembles the endogenous toxaemias of mammals *e.g.* eclampsia, and that it represents essentially a uraemic condition, the underlying causes of which are not known.—N. J. SCORGIE.

HARBITZ, F., & FÖLLING, A. (1940). Eindommelig avleiring av et kullvannstoff—en parafin—i leveren på ku. [**A Peculiar Deposition of a Hydrocarbon in the Liver of Cows**].—*Skand. VetTidskr.* **30.** 1101–1120. [English and German summaries].

A description of a hitherto unknown condition of the liver in two healthy slaughtered cows from different parts of Norway. There was no connexion between the two cases and it was not possible to trace the origin of the hydrocarbon found in the livers.

The livers were enlarged with thick rounded edges and the surface was very pale and dotted by brown-yellow spots and streaks. On section the substance was abnormally firm, but not cirrhotic. The hepatic lymph nodes were greatly enlarged and in colour resembled brain tissue. No fatty changes nor lipoid material could be revealed histologically in the liver, but an unstained substance arranged in lumps, some of which appeared like blunt crystals and proved on analysis to be a hydrocarbon, probably hentriacontane ($C_{31}H_{64}$), was present around and in the hepatic cells. It was even more abundant in the hepatic lymph nodes.

—J. E.

HALDANE, J. B. S. (1941). **The Partial Sex-Linkage of Recessive Spastic Paraplegia.** —*J. Genet.* **41.** 141–147. [Author's summary copied *verbatim*].

1. Recessive spastic paraplegia [of human beings] is due to a partially sex-linked gene. 2. Dominant spastic paraplegia is due to an autosomal gene. Partially sex-linked recessives are probably responsible for a small fraction of all cases of Friedreich's ataxia and spastic ataxia. 3. There are probably three or more allelomorphs of the partially sex-linked gene, determining different ages of onset.

FERNANDEZ, N. P. (1940). **Nymphomania with Sex Reversal in a Pedigree Sahiwal Heifer Treated back to Fertility.**—*Indian J. vet. Sci.* **10.** 98–102.

F. records observations and treatment of nymphomania followed by sex reversal in a pedigree Sahiwal heifer. The heifer was treated by ovarian massage, uterine douching (iodine lotion, 1 : 20), and subcutaneous inoculation of potassium iodide and of "detoxicated urine" from a pregnant cow, and was eventually got in-calf. The physical and mental male characters acquired during nymphomania gradually disappeared as pregnancy advanced and the heifer became a normal female.—B. SINGH.

I. —. (1941). **Discussion on the Problem of Blast Injuries.** [Speakers: ZUCKERMAN, S., HADFIELD, G., O'REILLY, J. N., ALSTON, J. M., & BARSBY, B.]—*Proc. R. Soc. Med.* **34.** 171–192.

II. —. (1941). **Lung Injuries in Air Raids. A Discussion on Pathology and Diagnosis.** [Speakers: BARCROFT, J., CAMERON, G. R., HADFIELD, G., DUNN, S., OSBORN, G. R., FAIRLEY, RYLE, J. A., ROBB-SMITH, A. H. T., WAKELEY,

C. P. G., Foss, Ross, J., Short, R. H.D., & Calder, R. M.]—*Brit. med. J.* Aug. 16th. 239–242.

I. In a series of experiments on the smaller animals, the effect of the blast set up by high explosives was found to produce injuries which varied according to the distance from the explosions and also with the susceptibility of the species. A description of the pulmonary and other internal lesions of affected animals is given, together with illustrations and microscopic sections.

In general it was found that blast, without causing external injury, may cause multiple haemorrhagic lesions in the internal organs of animals, but it is emphasized that air-raid conditions are likely to vary considerably from those produced experimentally.

The opinion is held that thoracic and abdominal lesions are due to the impact on the body wall of the pressure component of the blast wave and not to any suction wave acting directly through the upper respiratory passages.

II. Injuries to the lungs by poison "gases" and blast are discussed.

Mustard and lewisite "gases" act on the lung capillaries. In dogs exposed to phosgene, the haemoconcentration becomes high but quickly subsides although the oedema persists. In rabbits, oedema is marked but haemoconcentration is rare. Goats inhaling air contaminated with phosgene, to such an extent that the expired air smelt of phosgene, were obviously ill and restless but later, when killed, showed no pulmonary oedema. When the experiment was repeated with the same amount of phosgene (8 ml.) but at greater dilution, no ill effects were noted.

Carbon monoxide poisoning is a common complication of blast injury to the lungs (pulmonary concussion). Treatment for pulmonary concussion is immobilization with as little disturbance to the patient as possible.

Blast cases show immediate indisposition—with pain, dypsnoea, and perhaps haemoptysis, and are easily differentiated from gas cases. Rest is essential in all cases.—H. E. Bywater.

Lübke, A. (1941). Ueber die Rinderleukose in Mecklenburg. (Erhebungen in Betrieben mit Leukoseerkrankungen an Hand von Fragebögen). [**Bovine Leucosis in Mecklenburg**].—*Arch. wiss. prakt. Tierheilk.* **76.** 193–218.

This is a detailed analysis of a survey of bovine leucosis in Mecklenburg carried out by means of a questionnaire to which 458 replies were received. The incidence was greatest in large herds and this is probably explained by the effect of breeding from particular stud animals, which predisposes to the disease. The disease is more common in cows than in bulls and it is suggested that this may be due to the practice of slaughtering bull calves and using for stud purposes bulls from other herds. High yielding milch cows are especially prone to leucosis. The disease may progress slowly, and L. describes a case in a cow in which leucosis was diagnosed at biopsy 12 months before the animal showed clinical symptoms of the disease. Development may, however, become very rapid and the histological picture probably varies with the rate.

The role of unsuitable diet and soil deficient in minerals in producing the disease requires further research. No evidence was obtained that leucosis is infectious.—E. G. White.

I. *Gottschalk, A. (1938). Beitrag zur Papillomatose des Rindes. [**Papilloma of Cattle**]. — *Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **135.** 433].

II. *Lorenz, W. (1938). Beitrag zur Kenntnis der Papillomatose der Speiseröhre beim Rind. [**Papilloma of the Oesophagus in Cattle**].—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **135.** 433].

I. A general description of papillomas in cattle.

II. Description of two cases in cattle 2–3 years old. The skin was not affected.

Männel, H. (1938). Ueber Hamartome in der Niere bei Haustieren. [**Hamartoma of the Kidneys in Domestic Animals**]. —*Inaug. Diss., Leipzig.* pp. 48.

The greater part of this thesis consists of a general account of hamartomas and a review of recorded cases in man and domestic animals. A hamartoma is a tumour-like mass, composed of combinations of the tissue elements normally present in the organ in which it occurs, and arising as an error of development. In domestic animals there are records of the condition in the kidney, heart, liver, and spleen; the first is by far the most frequent site.

M. describes five cases in the kidney, two each in the horse and pig and one in a calf. The lesions consisted of renal tubules and glomeruli in varying stages of development, embedded in a fibrous stroma, and their structure is discussed in relation to the embryological development of the kidney.—E. G. WHITE.

LÁSZLÓ, F. (1941). Krebsgeschwülste der Nebenniere. **[Cancer of the Adrenals].** —*Dtsch. tierärztl. Wschr.* **49.** 328–330.

L. describes a single case of carcinoma of the adrenal in an ox and six cases in pigs. The tumour in the ox weighed 1 kg. and was soft, yellowish, and cystic in character. It was an adenocarcinoma with areas of lymphangiectasis, and arose from the adrenal cortex. There were no metastases. In the pigs the tumours varied from the size of a pea to that of a hazel nut, they were nodular and greyish in colour, and were sharply demarcated from the normal adrenal. There were no metastases. Histological examination showed four to be carcinomas, and one a "carcinofibrosarcoma"; the sixth was classified as a mixed tumour. There were areas of haemorrhage, degeneration, and cystic changes. All the tumours originated in the adrenal cortex.—E. G. WHITE.

MCCLELLAND, R. B. (1941). **Melanosis and Melanomas in Dogs.**—*J. Amer. vet. med. Ass.* **98.** 504–507.

This is a very brief account of melanin formation and deposition in dogs, together with a description of four melanotic tumours in this species. Two were malignant and they were both in Chows; one was a primary skin tumour and the other arose on the dorsal surface of the tongue. Metastases were found in the local lymph nodes and in the lungs. The other tumours were benign melanomas of the choroid in aged Boston terriers; they caused blindness and keratitis, and raised intra-ocular pressure. In one animal enucleation of the eyeball was carried out and the dog was in good health a year later. In the other dog the condition was bilateral and the animal was destroyed.—E. G. WHITE.

SELBIE, F. R. (1941). **A Transplantable Mammary Fibroadenoma of the Rat Showing Sarcomatous Changes.**—*Brit. J. exp. Path.* **22.** 156–166. [Author's summary copied *verbatim*].

A description is given of the results of transplantation and the growth characters of a rat mammary fibroadenoma in which various alterations of the epithelial and connective tissue components were found.

The formation of cellular fibromata and sarcomata was observed in a number of fibroadenomata in which the glandular tissue had wholly or partially disappeared.

It is suggested that the glandular tissue of rat fibroadenomata has, in some way or another, a restraining influence on the intrinsic malignancy of the fibrous component.

KENSLER, C. J., SUGIURA, K., YOUNG, N. F., HALTER, C. R., & RHOADS, C. P. (1941). **Partial Protection of Rats by Riboflavin with Casein against Liver Cancer caused by Dimethylaminoazobenzene.**—*Science.* **93.** 308–310.

It was found that all rats given dimethylaminoazobenzene (butter yellow) while on a diet of brown rice and carrots developed cirrhosis and cancer of the liver. When yeast was added to the diet no pathological changes in the liver developed. A combination of riboflavin and nicotinic acid gave partial protection. Neither casein nor riboflavin alone gave any appreciable protection, but when both were added to the diet marked protection was given, *viz*, out of 26 rats, one developed a hepatoma and four others showed microscopic evidence of damage without tumour formation.

—J. M. ROBSON.

WEST, P. M., & WOGLOM, W. H. (1941). **The Biotin Content of Tumours and other Tissues.**—*Science.* **93.** 525–527.

Acid hydrolysates of various tissues were assayed for biotin content by their effect on the growth of *Rhizobium trifolii*. It is stated that the skin, muscle, lung, and brain of full-term rat embryos contained considerably greater quantities than the corresponding tissues of adult rats. Shope rabbit papillomas and a number of carcinomas of human origin are also stated to contain greater quantities than corresponding normal control tissues dissected from the same or other subjects. Primary liver carcinomas, induced in rats by feeding *p*-dimethylaminobenzene, were, however, found to contain less biotin than the adjacent liver tissues.—ALASTAIR N. WORDEN.

NUTRITIONAL AND METABOLIC DISORDERS

AUBEL, C. E., HUGHES, J. S., & PETERSON, W. J. (1941). **Calcium Requirements of Growing Pigs.**—*J. agric. Res.* **62.** 531–542.

An endeavour was made to ascertain the minimum Ca requirements of growing pigs which were receiving 0·3% of dietary P which is regarded as the minimal P requirement of such animals.

In two series of experiments, a total of seven groups, each of 3–5 newly weaned Hampshire pigs, was used. The diets of the seven groups varied only in Ca, of which they contained 0·10, 0·25, 0·41, 0·55, 0·60, 0·80, and 1·0% respectively. The results were judged by the weight curves and clinical condition of the animals, by the values for serum Ca, inorganic P, and phosphatase and by the ash content and breaking strength of the bones. All groups which received 0·41% or more Ca remained normal, whereas the group receiving 0·10% and two of the five members of the group receiving 0·25% exhibited clinical symptoms of Ca deficiency [see also *V. B.* **9.** 334]. Even in the 0·10% group the serum Ca never fell below 8·92 mg. per 100 ml., and both these values and the growth rates tended to improve as the experiment progressed beyond the fourth month. There was a fall in serum phosphatase in those animals exhibiting clinical symptoms, while the bones of all members of the 0·10 and 0·25% groups broke more easily and had a lower ash content than those of the pigs which had received higher levels of Ca.—A. N. WORDEN.

ANON. (1941). **Rickets, Calcium and Cereals.** —*Nature, Lond.* **147.** 225–227.

In this short review the various tentative explanations of the rachitogenic action of cereals are discussed. From 50–80% of the P of cereals is present as phytin-P, phytin being the Ca-Mg salt of inositolhexaphosphoric acid. Phytin-P is, in some circumstances at least, available to the body, but its power of combination with Ca may render the latter element unavailable. When non-cereal diets are fed, however, the Ca of calcium phytate would appear to be as available as that of $CaCO_3$. Whatever its mechanism, the rachitogenic action of cereals may be overcome by feeding additional Ca.

A possible further complication is that diets high in Ca appear to decrease the availability of Fe, and perhaps that of Cu and other trace elements. The animal experiments from which this conclusion has been drawn have involved the feeding of very considerable quantities of Ca, and the only practical implication, at least in human nutrition, is to make it even more important that deficiency of Fe, as well as Ca, be corrected.—ALASTAIR N. WORDEN.

*IIZUKA, A., AMBO, S., SAITOH, S., & KIKUCHI, R. (1935). [**Osteomalacia in Horses in Japan**].—*Mitt. Regierungsseruminst. Tierseuchen.* **15.** 39–146. [In Japanese]. [Abst. from abst. in *Jber. Vet.-Med.* **59.** 404–405].

A review in German of four papers by the authors in the Japanese journal. The first two deal with Ca and P balances of seven horses clinically diagnosed as affected with osteomalacia [more correctly " osteodystrophia fibrosa " (see *V. B.* **2.** 168, and **3.** 264.)], and slaughtered for examination of bones. It was concluded that the disorder in Japanese horses was due to Ca deficiency and could be prevented by the addition of $CaCO_3$ to the diet. The third paper deals with experimental reproduction of the disorder in rabbits on diets in which rice or wheat bran predominated. The fourth deals with experimental reproduction in healthy horses on diets low in Ca and with adverse Ca : P ratios. Ca : P ratio of 1 : 3 was dangerous even on daily Ca intake above 7 g. per 100 kg. body weight. With adequate daily intake of Ca, a Ca : P ratio of 1 : 1·8 was safe for adults but not for young growing horses, and complete safety was only reached at 1 : 1·3. On the basis of analytical data on various feeding stuffs it is concluded that the rations used in Northern Japan are Ca-deficient for horses. Prevention of the disorder cannot be accomplished by exposure to sunshine or by administration of vitamins, but is readily prevented by correction of the mineral imbalance.—H. H. GREEN.

PATWARDHAN, V. N., & CHITRE, R. G. (1938–40). **Studies in Calcium and Phosphorus Metabolism. Part I. The Calcium and Phosphorus Content of the Soft Tissues of Normal Rats. Part II. The Effect of Toxic Doses of Vitamin D on the Ash, Ca, and P Content of the Bones and on the Excretion of N, Ca, and P in the Albino Rats. Part III. The Calcium**

Content of Soft Tissues of Albino Rats in Rickets and Hypervitaminosis D.—*Indian J. med. Res.* **25.** 633–642; **26.** 447–458, and **28.** 353–360.

CHITRE, R. G., & PATWARDHAN, V. N. (1940). **Studies in Calcium and Phosphorus Metabolism. Part IV. The Absorption of Calcium from the Intestine.**—*Ibid.* **28.** 361–369.

I. The maximum, minimum, and average values of Ca and P in the soft tissues of three groups of normal adult rats kept on different well-balanced diets from 17–24 weeks, are reported. Corresponding values for rats dying of extreme starvation are also given. The Ca and P in the soft tissues of normal rats varied considerably and different mean values were obtained for each group. [The fat content of the diets differed and the vitamin D content of the diets possibly influenced the Ca and P content of the tissues.] Irrespective of diet, the lungs contained the highest amount of Ca, the brain being next, and the liver containing the least. The Ca content of the spleens of starved rats was 120% higher than that found in the spleens of normal rats. The mean value for Ca in the liver of normal rats was unaltered by change of diet or starvation.

II. In rats receiving a daily dose of 4,500 I.U. calciferol (vigantol) orally or subcutaneously (1) the urinary excretion of Ca, P, and N increased, (2) the faecal Ca rose and fell irregularly, (3) more P was eliminated from the body than Ca, (4) the ash content of the bones was less than that of the normal rats, and (5) the Ca : P ratio was 2·59 as compared with 2·23 for normal rats.

III. In rachitic rats a significant reduction in the Ca content of brain and liver and an increase in that of lungs were observed. The values for muscle, spleen, testes, heart, and kidneys remained normal. Excessive dosage of vitamin D caused an increase in the Ca content of muscle, brain, spleen, testes, liver, and heart while the values for lungs and kidneys remained unchanged. Histological examination of tissues of these rats revealed no signs of calcification except in the kidneys of a few rats with hypervitaminosis.

IV. Calcium lactate or chloride introduced into the duodenum of anaesthetized dogs caused a rise in the Ca content of the portal blood serum and mesenteric lymph, which indicated that both the portal venous system and the mesenteric lymph nodes participated in the absorption of Ca from the intestines. The rise in Ca of the portal blood serum was independent of (a) the dose or the concentration of Ca salt, (b) the pH of the solution introduced, or (c) the preabsorption level of Ca in blood serum.—V. V. S. MURTY.

MILLER, R. C., KEITH, T. B., MCCARTY, M. A., & THORP, W. T. S. (1940). **Manganese as a Possible Factor Influencing the Occurrence of Lameness in Pigs.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 50–51.

In the course of growth studies of pigs it was noted that 30 out of 60 pigs became lame when fed on a ration comprised of yellow maize, tankage, soya-bean oil meal, ground alfalfa hay, and salt; the ration had a relatively high mineral content but was very low in manganese. At all times the animals had access to direct sunlight. Outwardly the condition resembled rickets but was not alleviated or affected in any way by the addition of Ca and P or by cod liver oil and irradiated yeast. Analysis showed that the mineral content of the bones was normal but gross examination showed that the distal extremities of the radii and ulnae were enlarged and roentgenographs of these bones indicated an increased activity of the tissues at the osteochondral junction. Addition of manganese sulphate to the ration in amounts to supply 50–60 p.p.m. of Mn prevented any lameness developing in an experimental group of 15 pigs, while 50% of litter- and pen-mates of these pigs fed unsupplemented rations became lame. Addition of Mn, however, was ineffective in curing lameness after it had developed.

The authors do not claim any similarity between perosis in chicks and the type of lameness in pigs described, but they suggest a possible role of Mn in the nutrition of pigs which apparently involves bone development.

—R. ALLCROFT.

RIDDLE, J. W., SPIES, T. D., & HUDSON, N. P. (1940). **A Note on the Interrelationship of Deficiency Diseases and Resistance to Infection.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 361–364.

Studies on 150 cases (human) of clinical pellagra, riboflavin deficiency, beriberi, and other associated deficiency diseases indicated a relationship between the diseases and the resistance to, and presence of, infections with *Staphylococcus aureus* and *Streptococcus haemo-*

lyticus. Lesions characteristic of riboflavin deficiency contained nearly pure cultures of *Staph. aureus* and *Str. haemolyticus*; after administration of riboflavin or substances rich in it, the lesions healed rapidly and the organisms disappeared. Similarly, following specific therapy with anti-pellagric substances, the bacterial flora of the ulcerations characteristic of this deficiency disease promptly disappeared. A low complement titre was found in acutely deficient patients and in subclinical and mild cases the titre was slightly subnormal or normal; on clinical improvement the complement titre increased. A distinct depression in the bactericidal power for *Staph. aureus* was observed in the blood of acutely deficient patients, while in the blood of subclinical and mild cases of vitamin deficiency, there was only a slight diminution in staphylococcidal power. —R. ALLCROFT.

PALLASKE, G. (1940). Ueber Mangelkrankheiten bei Schafen. [**Deficiency Diseases in Sheep**].—*Dtsch. tierärtzl. Wschr.* **48.** 525–531.

Common diseases of sheep are discussed and a condition due to nutritional deficiency in the eastern part of Prussia is described. The disease occurred chiefly during the months of February, March, and April when the sheep had been in stalls for two months or more and had received unsatisfactory rations. Pregnant ewes and young lambs were most severely affected and the onset of symptoms was usually very sudden and the disease often fatal. When the sheep were turned out to pasture again the disease abated. The symptoms included ataxia and unsteady gait, and the animals lay on their sides with legs outstretched and head retracted. P.M. examination of organs and tissues of sheep which died showed oedema, with notable accumulation of fluid about the heart and degeneration of the heart muscle with signs of calcification and fatty infiltration of the heart-muscle fibres. Degeneration of muscle fibres in the walls of the oesophagus was also found. There was no evidence of infection or poisoning. Deficiencies of protein, minerals, and vitamins of the B complex are suggested as possible factors in the aetiology of the condition.—A. M. COPPING.

ALMQUIST, H. J., & ZANDER, D. (1940). **Adsorbing Charcoals in Chick Diets.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 303–305.

Addition of 2% of an adsorbing charcoal to a diet adequate for normal growth and health of chicks resulted in the development of symptoms of avitaminoses A, B_2, and K, and of gizzard factor deficiency in groups of experimental chicks. When added to a mash very richly supplied with all the factors in question, no outward deficiency symptoms were noticed. These results indicate that addition of charcoal to poultry rations may not be beneficial especially if the rations do not contain an abundance of the necessary vitamins.—R. A.

RUBIN, M., BIRD, H. R., & DEVOLT, H. M. (1941). **Avitaminosis A in Commercial Poultry Flocks.**—*Poult. Sci.* **20.** 155–160.

Liver samples of 83 chicks from 25 commercial flocks suspected of borderline vitamin A deficiency, were assayed for vitamin A content. Thirty samples from 13 flocks had less than 15 units per g. It is concluded that vitamin A deficiency was at least partly responsible for the slow growth and development of these chicks. Eighteen samples of alfalfa meal used in poultry rations were also assayed for carotene content. Only six of the samples, fed at a level of 5% of the ration, would have supplied sufficient carotene to cause storage to take place. The results indicate that if the vitamin A of cod liver oil has been seriously depleted by destruction during storage, alfalfa meal cannot be wholly relied upon to make good the deficiency unless it is known to have a high carotene content.—F. D. ASPLIN.

POLK, H. D., & SIPE, G. R. (1940). **The Effect of Vitamin A Deficiency on Malposition of the Chick Embryo.**—*Poult. Sci.* **19.** 396–400.

Observations were made upon the incidence of malposition of chick embryos dying between the 18th and 21st day of incubation. 147 or 8·4% of the embryos in 1,745 fertile eggs produced by hens on a vitamin A deficient ration were abnormally placed. Of the embryos in 2,216 eggs produced by hens on a vitamin A adequate ration, 110 or 4·9% showed abnormal positions.—F. D. ASPLIN.

KAO, H. C., & SHERMAN, H. C. (1940.) **Influence of Nutritional Intake upon Concentration of Vitamin A in Body Tissues.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 589–591.

Estimations were made of the vitamin A

content of the livers and muscles of rats which had received diets containing different amounts of the vitamin. It was confirmed that the greater part of a surplus intake of vitamin A was stored in the liver. In the case of muscle, the vitamin A contents were low whether the animals had a diet which was adequate in the vitamin or enriched, but the authors consider that the differences between the mean values for a series of four experiments are probably significant. It is suggested that healthy muscle contains a small amount of vitamin A as a normal constituent and that the concentration of the vitamin in the muscle is in some measure influenced by the level of nutritional intake.

—ALASTAIR N. WORDEN.

SEIFRIED, O. (1940). Die Gewebsveränderungen bei Hühnern, Ratten und Meerschweinchen nach Ueberdosierung von Vitamin A. (Ein Beitrag zur Wirkungsweise dieses Vitamins.) [**Tissue Changes in Fowls, Rats, and G. Pigs after Overdosage of Vitamin A**].—*Arch. wiss. prakt. Tierheilk.* **75.** 241–251.

Fowls, rats, and g. pigs were given large doses of vitamin A as " vogan " for 6–30 days. The first symptom of overdosage was loss of weight, and P.M. examination of tissues showed hyperplasia and defective keratinization of mucous membranes and of the skin. This is well illustrated by sections of the oesophagus from animals receiving excessive vitamin A in comparison with sections from controls on normal diet. There was severe fatty infiltration in the reticulo-endothelial system and in the endothelial cell walls in the liver, spleen, kidneys, and lungs. These findings confirmed those of DOMAGK & DOBENECK (1933) and, taken in conjunction with observations of many workers on vitamin A deficiency, indicate the importance of vitamin A for maintaining the health of epithelial tissues and for regulating fat metabolism.—A. M. COPPING.

PAPPENHEIMER, A. M. (1940). **Prevention of Nutritional Myopathy of Ducklings by α-Tocopherol.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 457–459.

A nutritional disease of Pekin ducklings characterized by extensive degeneration of the voluntary muscles was completely prevented during the experimental period of 16–34 days by the daily administration of 4 mg. of synthetic α-tocopherol (vitamin E); 1 mg. daily did not give protection.—R. ALLCROFT.

ALMQUIST, H. J., & MECCHI, E. (1941). **Influence of Bile Acids, Vitamin K and Cincophen on Erosions of the Chick Gizzard Lining.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 168–172.

Results confirming an earlier report [*V. B.* **8.** 725.] showed that the addition of cholic and dehydrocholic acids at 0·5% of the diet prevented gizzard erosion in chick. Vitamin K and other anti-haemorrhagic compounds had no preventive action on the occurrence of this disorder. Chicks reared on a practical mash which ordinarily permitted no erosions developed erosions closely resembling the deficiency type when cincophen was added to the diet; at least 1% cincophen was necessary to cause severe lesions while 2% inhibited growth and caused heavy mortality. Development of the cincophen-induced erosions was largely prevented by the simultaneous feeding of cholic acid and of beef bile salts.—R. ALLCROFT.

MCELROY, L. W., & GOSS, H. (1939). **Report on Four Members of the Vitamin B Complex Synthesized in the Rumen of the Sheep. [Correspondence].**—*J. biol. Chem.* **130.** 437–438.

In experiments on four sheep fed on a diet deficient in the vitamin B complex, it was found that vitamins B_1, B_6, riboflavin, and the filtrate factor were synthesized in the rumen.

—ALASTAIR N. WORDEN.

I–IV. MCELROY, L. W., & GOSS, H. (1940–41). **A Quantitative Study of Vitamins in the Rumen Contents of Sheep and Cows Fed Vitamin-Low Diets. I. Riboflavin and Vitamin K. II. Vitamin B_6 (Pyridoxine). III. Thiamin. IV. Pantothenic Acid.**—*J. Nutrit.* **20.** 527–540 and 541–550; **21.** 163–173 and 405–409.

V. MCELROY, L. W., & JUKES, T. H. (1940). **Formation of the Anti Egg-White-Injury Factor (Biotin) in the Rumen of the Cow.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 296–297.

VI. WEGNER, M. I., BOOTH, A. N., ELVEHJEM, C. A., & HART, E. B. (1940). **Rumen Synthesis of the Vitamin B Complex.**—*Ibid.* 769–771.

VII. HUNT, C. H., KICK, C. H., BURROUGHS, E. W., BETHKE, R. M., SCHALK, A. F., & GERLAUGH, P. (1941). **Studies on Riboflavin and Thiamin in the Rumen**

Content of Cattle.—*J. Nutrit.* **21.** 85–92.

I. Further details are given of the experiments which demonstrated the ruminal synthesis by four ewes of riboflavin, filtrate factor and vitamin B_6 [see preceding abst.]. A cow with a rumen fistula was maintained in excellent health for nearly five months on a basal diet identical with that used for the sheep. During that period she bore a calf which she reared successfully. By chick growth tests it was found that samples of her dried ruminal contents contained 25 μg. riboflavin, and a sample of her dried skim milk at least 20 μg., per g. A clotting-time test made with chick blood indicated that the dried ruminal contents had a vitamin K potency about one-sixth that of standard dried alfalfa.

II. By rat tests it was shown that the dried ruminal contents of the cow referred to in I contained about 8 μg. per g. of vitamin B_6, whereas the basal diet contained only 1–1·5 μg. per g. The vitamin B_6 potency of the milk appeared to be about the same as that of normal milk.

III. Vitamin B_1 was found in the ruminal contents of a non-fistulated cow, but not in those of two fistulated animals. The milk of the last two was found, however, to contain 2–2·5 μg. vitamin B_1 per g. of total solids as determined by chick tests. The ruminal contents of the four sheep referred to in I contained about 7 μg. of vitamin B_1 per g. The ruminant rations contained less than 0·4 μg. of vitamin B_1 per g.

IV. By Juke's filtrate factor method it was shown that the ruminal contents of the cow and of the sheep mentioned in I contained 20–30 times the pantothenic acid activity of the deficient ruminant ration.

V. Dried ruminal contents of the cow referred to in I were found to be better than a sample of can molasses (assayed microbiologically and found to contain 2·6 μg. per g. of biotin) in the prevention of egg-white dermatitis of chicks. The cow's ration was completely ineffective as a supplement to the chicks' basal egg-white-injury diet.

VI. Similar results to those reported by McElroy & Goss are recorded for the ruminal contents of a fistulated heifer calf. The synthesis of vitamins B_1, B_6, riboflavin, nicotinic acid, pantothenic acid, and biotin is confirmed. In the case of riboflavin and biotin, microbiological assay methods were used.

VII. Ruminal synthesis of riboflavin and of vitamin B_1 was demonstrated by rat test for fistulated steers receiving rations of yellow maize, lucerne hay, and protein supplement. Riboflavin synthesis did not appear to occur in two steers receiving a ration of lucerne hay only. The activity of the ruminal contents as a source of vitamin B_1 was found to decrease with the time of sampling: samples taken 12 hours or more after feeding were less active than the ration itself.—Alastair N. Worden.

Culton, T. G., & Bird, H. R. (1940). **The Effect of Some Riboflavin Supplements on Chick Growth and Curled-Toe Paralysis.**—*Poult. Sci.* **19.** 424–430.

Chickens fed on a diet containing as much as 475 μg. of riboflavin per 100 g. were not fully protected against "curled-toe" paralysis. It is suggested that there may be other factors which influence the occurrence of this condition, such as breed differences or differences in the efficiency of utilization of riboflavin from different types of ration.

A method of preparing riboflavin-free casein by extraction with water in the autoclave is described. This method has advantages over the alcohol extraction method in that it is cheaper, more rapid, and the product contains less flavin.—F. D. Asplin.

Morgan, A. F. (1941). **The Effect of Imbalance in the "Filtrate Fraction" of the Vitamin B Complex in Dogs.**—*Science.* **93.** 261–262.

Preliminary details are given of some experiments which have an important bearing on the physiological relationships and interactions of the B_2 vitamins. A basal diet of washed casein, sucrose, crisco, salt mixture, carotene, cod liver oil, vitamins B_1, B_6, and riboflavin was fed from weaning to Cocker Spaniel pups. This diet proved adequate for positive controls when supplemented by yeast filtrate factor (fuller's earth filtrate of acetone extract), nicotinic acid, and pantothenic acid. Puppies receiving only the basal diet survived and grew moderately well, but showed progressive depigmentation of hair and inactivity. The administration of either nicotinic acid only or of pantothenic acid only to such animals was followed by gradual loss of neuro-muscular control and sometimes by death. The danger of administering large doses of a single vitamin

to patients with multiple deficiencies is therefore stressed.—ALASTAIR N. WORDEN.

OWENS, H. S., TRAUTMAN, M., & WOODS, E. (1941). **Nutritional Factors Concerned in Rusting of Albino Rats.**—*Science.* **93.** 406–407.

Rusting of the fur of albino rats was prevented by supplementing the basal diet with at least 40 μg. of pantothenic acid and with 20 mg. of choline daily. This appears to indicate that whatever the factors are that prevent the development of rustiness in albino rats, the liver must play an important role in their metabolism. These results agree with those of GYÖRGY *et al.* [*V. B.* **11.** 631].—R. ALLCROFT.

SALMON, W. D., & ENGEL, R. W. (1940). **Pantothenic Acid and Hemorrhagic Adrenal Necrosis in Rats.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 621–623.

Results are given confirming the observations of DAFT *et al.* [see *V. B.* **10.** 543, and **11.** 630.] that pantothenic acid prevents the adrenal haemorrhage and necrosis which frequently occurs in rats maintained on a diet deficient in a filtrate factor concentrate.—R. ALLCROFT.

GYÖRGY, P., ROSE, C. S., EAKIN, R. E., SNELL, E. E., & WILLIAMS, R. J. (1941). **Egg-White Injury as the Result of Non-absorption or Inactivation of Biotin.**—*Science.* **93.** 477–478.

Egg-white injury develops in rats or chicks which are fed on a diet containing large amounts of egg-white but which are usually, though not necessarily, deficient in biotin. The fraction of albumin responsible has been termed "avidalbumin", and its toxic properties are destroyed by prolonged heating. The toxic properties of the "avidalbumin" fraction were confirmed in rat experiments, and from the known ability of this fraction to combine with biotin *in vitro* to form a stable compound, it is postulated that it acts similarly in the digestive tract and so renders the biotin unavailable.

The authors conclude by stating that the mechanism of egg-white injury appears to represent a hitherto unknown principle in the production of disease.—ALASTAIR N. WORDEN.

HEGSTED, D. M., MILLS, R. C., ELVEHJEM, C. A., & HART, E. B. (1941). **Choline in the Nutrition of Chicks.**—*J. biol. Chem.* **138.** 459–466.

The addition of 12% fish meal, 5% yeast, or 0·05% choline to a basal diet prevented the development of perosis but did not produce maximum growth, whilst 0·1% choline both prevented perosis and resulted in good growth. The fat content of the livers of choline-deficient chicks was the same as of those receiving choline.

Chicks perosis is usually associated with rations high in Ca and/or P or low in Mn. The basal ration used was well balanced in these factors. A decrease in bone phosphatase activity has been reported in perosis [see *V. B.* **12.** 47.], but no differences were found in the phosphatase content of the bones of choline-supplemented and choline-deficient chicks. —F. D. ASPLIN.

JUKES, T. H. (1941). **Effects of Choline, Gelatin and Creatine on Perosis in Chicks.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 155–157.

In contrast to turkeys [see *V. B.* **11.** 53.], chicks on a simplified diet, deficient in choline, did not develop perosis unless gelatin or creatine was added. Addition of 0·1% choline to the diet prevented the perosis, but lower levels were only partly effective.—R. ALLCROFT.

CAMERON, H. S., & GOSS, H. (1940). **Preparturient Paresis in Ewes.**—*J. Amer. vet. med. Ass.* **96.** 165–170.

Forty-two ewes of various ages and breeds were divided into four groups and subjected to conditions designed to show the influence of lack of exercise and sudden change in environment and diet on the sugar, alkali reserve, and acetone content of the blood. It was hoped to produce preparturient paresis or at least a blood picture showing a trend towards that found in the disease, but no cases were produced. In one group on a high fat diet with no exercise, the alkali reserve was found to be significantly lower than that of the other three groups. Field observations were also made on a number of cases which occurred in adjacent flocks. Although the experiments showed that exercise in itself is not a factor, it was found that further losses were prevented by enforced exercise in a flock of 1,500 ewes in which 15 cases of preparturient paresis had occurred. Intravenous administrations of glucose did not prevent death in affected cases, although it did produce the acetonaemia. Blood sugar and alkali reserve levels are given for 220 samples of sheep blood.—R. ALLCROFT.

PHYSIOLOGY

LEE, R. C., COLOVOS, N. F., & RITZMAN, E. G. (1941). **Skin Temperatures of the Pig, Goat, and Sheep under Winter Conditions.**—*J. Nutrit.* **21.** 321–326.

Skin temperature measurements were made on two sheep, a pig, and a goat at environmental temperatures between −12° and +21°C. The sheep and the goat maintained their skin temperatures near 30°C. even when the environmental temperatures were at freezing point or below, but the poorer external protection afforded by the thin hair coat of the pig did not enable it to maintain such uniformity. Adjustment to changes in environmental temperature was much more rapid in the goat than in the pig. Metabolism measurements showed that the heat production of the sheep was not affected by the environmental temperature at least down to 0°C., but when the fleece was removed the heat production increased. The metabolism of the goat increased immediately on fall in temperature demonstrating that the relative uniformity in the goat's temperature is due both to its increased metabolism and to the protection of its coat. The heat production in the pig remained uniform between 12° and 24°C., protection against cold being afforded by the large fat deposits in and under the skin.—R. ALLCROFT.

AKOPYAN, K. A. (1939). Vozrasbnaya izmenchivosti kartiny krovi krupnogo rogatogo skota. [**Age Variability of the Blood Picture of Cattle**].—*Dokl. Akad. sel'skohoz. Nauk.* No. 5/6. pp. 23–30. [In Russian]. [Abst. in *Anim. Breed. Abstr.* **8.** 230, copied *verbatim*].

The material consisted of 97 animals varying in age from 7 days to 7–8 years. Excluding the 8 under 1 mth., live weight ranged from 67 kg. to 575 kg., and weight of blood from 5·27 kg. to 47·74 kg., of which plasm weighed 3·22–29·57 kg., formed elements 2–18 kg., and haemoglobin 0·79–6·42 kg. A high positive correlation was found between blood weight and body weight, *viz.* for formed elements, r = 0·70, for plasm, 0·89, and for the other two, 0·87. On the other hand, the number of red and white cells and Hb% tend to decrease with age, the erythrocytes from 9,700,000 to 6,700,000, Hb from 14·93% to 13·04%; the number of leucocytes, however, is about constant from 1 mth. to 2 yrs. (5700–6000) but is considerably higher in 7–15-day-old calves, *viz.* 9700, and increases again in adult cows to 7600. Age variability was also observed in erythrocyte size. The average diameter at 7 days of age (4 calves) is 5·39μ; there is a drop to 5·07 at 15 days (4 calves), and the curve rises irregularly to a peak of 5·88μ at 7–8 yrs. The coefficient of variation in erythrocyte size at different ages ranges from 11·52% to 16·5%. Young animals have a larger proportion of small erythrocytes (3–5μ) than large ones (6–9μ), *viz.* up to 3 mths. the figures are 39·6% *v.* 20·29%. Thereafter the values become reversed to 21·32% *v.* 40·33% at 6–24 mths. and 9·9% *v.* 61·8% in adult cows.

ALLISON, J. B., DRESKIN, H. O., & MORRIS, M. L. (1941). **Data and Bibliography on Some Nitrogenous Constituents of Normal Dog's Blood.**—*Amer. J. vet. Res.* **2.** 196–198.

Serum values for total protein, albumin, globulin, and non-protein nitrogen from 20 normal dogs are presented together with the whole-blood values for urea nitrogen, creatinine, and uric acid. The average values reported correspond closely with those obtained from numerous data in the literature on the concentration of proteins in the sera of dogs. An extensive bibliography is given and the values obtained by other workers are discussed.

—R. ALLCROFT.

SPITZER, E. H., COOMBES, A. I., & WISNICKY, W. (1941). **Preliminary Studies on the Blood Chemistry of the Fox.**—*Amer. J. vet. Res.* **2.** 193–195.

This investigation was undertaken to establish average blood indices for normal growing and mature foxes with reference to haemoglobin, haematocrit measurements, erythrocyte counts, serum Ca, and total inorganic P. As the silver fox is a colour phase of the red, both types were studied to see whether data from one phase would be applicable to the other.

It was found in 12 silver foxes that the average r.b.c. count was 7·97 million per cu. mm., the packed cell volume 59%, and the haemoglobin concentration 15 g. per 100 ml. of blood.

Mean corpuscular volume, mean corpuscular haemoglobin, and mean corpuscular haemoglobin concentration values were 74·8 cu. μ, 18·77 micromicrograms, and 25·1% respec-

tively. It will be seen that some of these values are distinctly higher than those of the adult dog, although the latter values (M.C.V., M.C.Hb and M.C.Hb conc.) are of about the same order. There is a proportional increase of r.b.c. in the fox with age. The data are similar in red and silver foxes.—D. L. HUGHES.

GRÜNEBERG, H. (1941). **The Growth of the Blood of the Sucking Mouse.**—*J. Path. Bact.* **52.** 323–329.

Total haemoglobin and blood volume estimations were carried out on 80 unweaned mice aged 0–3 weeks and the values obtained were compared with those for adult mice. The mean blood volume per unit weight was 65·3 ml. per kg. body weight at birth and dropped rapidly to a value of 50·9 ml. per kg. after one week. This was followed by a gradual rise to a second maximum reached at or shortly after weaning (about three weeks). Following this there was a decline with increasing body weight. A similar sequence has been described for the rat and for man, so it may be a general feature of mammalian growth.—F. AYLWARD.

MINARD, D. (1941). **The Presence and Distribution of Histamine in Blood.**—*Amer. J. Physiol.* **132.** 327–335.

Blood histamine was determined by electrodialysis of blood extracts followed by assay on isolated g. pig intestinal strips. Evidence was obtained of the presence of histamine in the blood of both dogs and rabbits. In rabbits the histamine is almost exclusively in the platelets, but in dog blood the platelets contain only a small part of total blood histamine.—F. A.

EDEN, A. (1941). **Further Observations on the Blood Copper of Northumbrian Sheep.**—*J. agric. Sci.* **31.** 186–193.

Blood copper data are reported on 94 sheep divided into four experimental groups on a "border pining" hillside in Northumberland in 1940, and are compared with data published in 1939 [see *V. B.* **10.** 468]. The mean value for comparable sheep was 0·080 mg.% in 1940 as compared with 0·086 mg.% in 1939, the overall range of 0·013–0·210 mg.% being even wider than before. Variations between values for the same individuals in 1939 and 1940 were as wide as between different individuals in either year, and variations between individuals comprising a group were as wide as variations between groups, despite moderate variations in Cu intake. Only in young sheep was there any evidence that a mineralized cake supplement, containing sufficient Cu to double the natural grazing intake, had any elevating effect on blood Cu. The significance of these data is discussed in relation to those reported for Derbyshire ewes bearing lambs affected with "swayback".—J. P. GARDNER.

EDEN, A. (1941). **Studies on the Excretion of Copper in the Rabbit.**—*J. agric. Sci.* **31.** 145–160.

Deals with the elimination of large quantities of copper introduced by various routes into the rabbit. Cu is mainly excreted in the faeces, when the intake is normal. Urinary elimination ranges between 0·07–0·08 mg. per litre, and faecal elimination about 2·5 mg. per 100 g. of dry matter, which may account for over 96% of the total food Cu. When abnormally large quantities are given, in the food, by stomach tube, or intravenously, Cu is also mainly excreted in the faeces. Increased urinary Cu is an index of a temporary rise in blood Cu level. An unexpected delay in faecal excretion resulted in the discovery of the phenomenon of coprophagy or "normal physiological faecal refection" [see also *V. B.* **10.** 635]. There is no evidence of much intestinal absorption of Cu, probably due to the insoluble state of the element, and this fact probably explains the impossibility of chronic Cu poisoning.—J. G.

GUTOWSKA, M. S., PARROTT, E. M., & SLESINSKI, F. A. (1941). **Manganese Absorption in the Fowl.**—*Poult. Sci.* **20.** 379–384.

A method of estimating Mn absorption is described. This involves withdrawing and tying off a loop of small intestine. After suturing, test solutions are injected into the isolated section. At intervals the contents are drawn off and the quantity of Mn estimated. From a limited number of experiments it is concluded that the absorption of Mn by the fowl from solutions of Mn in normal saline is proportional to the concentration of Mn. Ca and P salts in concentrations similar to those used in poultry rations did not inhibit the absorption of Mn. —F. D. ASPLIN.

TRAUTMANN, A., & ASHER, T. (1941). Zur Frage der Zelluloseverdauung im Blinddarm des Wiederkäuers. **[Cellulose Digestion in the Caecum of Ruminants].** —*Dtsch. tierärztl. Wschr.* **49.** 24–26.

Strips of epidermis of the onion were

enclosed in a perforated capsule and placed in the caecum of a goat with a permanent caecal fistula. The capsule was withdrawn at intervals and the epidermis was stained with chloro-zinc iodine and examined microscopically.

After six hours no histological change could be detected, but cellulose digestion was apparent after eight hours and then progressively increased with time; in cells in which it was complete only the cell membrane was visible. The authors consider that fermentation of cellulose in the caecum is of no significance as, according to their earlier observations, ingesta do not remain longer than three hours in the caecum of goats.—A. T. PHILLIPSON.

ESPE, D., & CANNON, C. Y. (1940). **The Length of the Intestine of Calves and its Bearing on the Absorption of the Nutrients from the Chyme.**—*J. Dairy Sci.* **23.** 1211–1214.

Measurements of the length of the small intestine were made on four calves by the method described by these authors. It was found to be about "seven times the body length or one-third the P.M. length" [basis of these measurements not explained]. The small intestine of ruminants is long in comparison with that of carnivores, and it is suggested that owing to the fibrous nature of the food, the passage of ingesta through the small intestine is rapid. Consequently, in order for absorption to be complete, greater length is necessary.

—A. T. PHILLIPSON.

WELLS, H. G. (1940). **Adipose Tissue, A Neglected Subject.**—*J. Amer. med. Ass.* **114.** 2177–2183 and 2284–2289. [Abst. from abst. in *Amer. J. Cancer.* **39.** 441–443].

Although adipose tissue constitutes a large part of the total bulk of the body (about 18%) and is subject to many physiological variations and pathological alterations, it has been the subject of relatively little study. Fatty tissue is not merely common connective tissue loaded with stored fat, but is to a large extent structurally, developmentally, and functionally an independent special tissue more comparable to the ductless glands. TOLDT maintained for many years that adipose tissue is derived from special primitive fat organs characterized by the formation of highly vascular, lobular structures in which a special type of cell exists with the function of storing and giving up fat in accordance with supply and demand. Such specialized tissue is well developed in certain species, especially in hibernating animals. In emaciated infants subcutaneous adipose tissue may appear in the form of pinkish lobules composed of large cells rich in cytoplasm and resembling closely a glandular structure, with no resemblance to ordinary adipose tissue, but corresponding to the pre-adipose tissue described by embryologists or to the brown adipose tissue and to hibernating glands in the exhausted state. The view that adipose tissue is, at least in part, derived from primitive connective-tissue elements is supported by embryological studies and by its behaviour in tumours derived from these structures embryologically, *e.g.* the retroperitoneal lipomyxosarcomas are quite characteristic structures in which mucus may form in abundance, and some early lipomas so closely resemble reticulo-endothelial tumours as to indicate the common origin of adipose and lymphatic tissues. Two types of liposarcoma can be recognized:– (1) composed of granular cells resembling the adult fat cell type, and (2) the embryonal liposarcoma or lipomyxosarcoma which exhibits a proliferation of minute vessels, the adventitial or endothelial cells of which, instead of producing fat, form chiefly mucus and occasionally embryonal fat tissue.

Adipose tissue may be looked upon as a part of the reticulo-endothelial system; this would explain the close relationship of bone marrow and adipose tissue, the occurrence of extramedullary haemopoiesis in adipose tissue, and also the tendency for lymphoid tissue sometimes to replace fat tissue and conversely, as seen especially in the thymus. This conception of adipose tissue suggests more active function than has been generally recognized and is in harmony with the gland-like histologic character of the unfatted fat organs. On the other hand, the relation of adipose tissue to the endocrine system has been suggested partly because of its resemblance to the involuted thymus or the vacuolated cells of the adrenal cortex and because these adipose glands are rich in lipoid. The pathological conditions such as the "fat neck" of Madelung and many of the cases of adiposis dolorosa are included under the heading of diffuse symmetrical lipomatoses and a relationship of adipose tissue to the ductless glands is discussed in these conditions.

Fluctuating atrophy and hypertrophy of the fatty tissues occur frequently in a variety of

pathological disorders, *e.g.* the replacement of functional bone marrow by fat, the fatty infiltration of a damaged heart, the replacement of an atrophic pancreas, and the substitution for muscle in the pseudohypertrophic muscular atrophy.

SWANSON, E. W., & HERMAN, H. A. (1941). **Variations in Bull Semen and their Relation to Fertility.**—*J. Dairy Sci.* **24.** 321–331.

A record was made of the semen properties and the breeding results of ten bulls at the University of Missouri. Wide variations occurred in samples of semen from each bull and also in successive samples from the same bull. The property which appeared most significantly related to breeding efficiency was the duration of motility after storage at 40°F. There also appeared to be a rough correlation between initial motility and viability in storage. Within reasonable limits the volume, pH concentration, percentage of abnormal spermatozoa, and initial motility *per se* did not appear to be related to fertility.

It is suggested that in order to assess the fertility of a bull, the examination of at least five semen samples collected over a period of two weeks, is necessary.—D. D. OGILVIE.

KNAPP, B., Jr., LAMBERT, W. V., & BLACK, W. H. (1940). **Factors Influencing Length of Gestation and Birth Weight in Cattle.**—*J. agric. Res.* **61.** 277–285.

During the period 1932–38, observations were made on the gestation period of cows and birth weight of their calves. Sixty-five beef shorthorn and 68 milking shorthorn cows were involved. There were 297 parturitions. The gestation period of beef shorthorns averaged 280·8 days and of milk shorthorns 281·7 days. The respective birth weights were 69·2 and 79·2 lb. Male calves of each breed were heavier than females by 4·7 and 3·5 lb. respectively. Usually increased length of gestation indicated increased birth weight. The season of calving had little or no influence on the factors under investigation. In general there was less difference between successive calves of one dam than between the calves of different cows.—D. D. OGILVIE.

KARRAS, W. (1941). Die Thymusdrüse und ihre Beziehungen zu den Keimdrüsen. **[The Thymus Gland and its Connexion with the Gonads].**—*Tierärztl. Rdsch.* **47.** 27–31 and 37–41.

A review is presented of previous work and views upon the inter-relationship of the thymus gland and the reproductive organs. The fact that the thymus normally atrophies at puberty suggests a reciprocal antagonism between the functions of the thymus gland and the gonads. Experimental investigation of the problem has followed three lines. Firstly, the changes in the gonads after extirpation of the thymus have been examined. Findings range between those of PATON and of KLOSE & VOGT, who reported a hypertrophy of the testes and ovaries in animals after removal of the thymus gland and those of SOLI and of LUCIEN & PARISOT, who observed a decline in the growth of the gonads after this operation. K. draws attention to the difficulty attending complete removal of the thymus, especially in young animals, but concedes that in much of the work cited this has been confirmed by histological examination. He refers also to the work of PARK, who showed accessory thymus tissue to be demonstrable histologically in a number of organs and suggests that after extirpation of the thymus gland this tissue may in some cases take on a pronounced compensatory function.

Secondly, observation has been made of the changes occurring in the thymus as a result of gonadectomy. It is agreed that the activity of the thymus is prolonged by gonadectomy, though opinion is divided as to whether this is due to retarded involution or to actual hypertrophy.

Thirdly, a number of workers have fed or injected animals with various preparations of thymus tissue and from these experiments the balance of evidence suggests that such treatment leads to the retardation of sexual development and to degeneration of the germinal epithelium.

K. concludes that the results cited prove that the thymus gland and the gonads are specifically inter-related and strongly suggest that the relation is such that full activity of either precludes that of the other. The questions whether this antagonism is hormonal and whether it is direct or mediated by the hypophysis are left unsettled.

K. describes three series of experiments in which he studied the effects upon the sexual functions of administering calf's thymus tissue to mice. In the first the animals used were sexually mature female mice in which the regular recurrence of a normal oestrus cycle had been confirmed by daily examination of

vaginal smears. One group of these animals received calf's thymus in daily doses of 0·25–0·8 g. (dry weight) with their food; a second group were given subcutaneous injections of 0·1–0·2 c.c. of a suspension of minced thymus four times weekly, and a third group were given oral and parenteral treatment together. Daily vaginal smears were taken of all animals in this series. They showed that the treatment resulted in a disturbance of the normal oestrus rhythm characterized by irregular oscillation between dioestrus and pro-oestrus. Only two animals went into full heat and showed fully cornified smears within the first 30 days of treatment. Thereafter the smears from most of the animals were of the cornified type associated with oestrus, but since the ovaries of these mice showed no corpora lutea, K. regards this as a purely local reaction of the vaginal mucosa to the long continued process of taking material from smears.

In a second series infantile female mice weighing 6–8 g. were used. Three groups of such animals were given parallel treatment to that of the three groups in the first series. All these mice died from the toxic effects of the treatment before reaching sexual maturity. Sections of the ovaries of the last surviving mouse revealed a marked retardation of follicular maturation.

In the third series of experiments mature male mice were given 0·2–0·8 g. of dry thymus tissue daily by mouth and initially 2–4 injections weekly. Owing to the toxic effects of the injections these were later discontinued. Two mice, after 50 days' treatment, made no attempt to copulate with receptive females.

—A. L. Walpole.

Young, F. G. (1941). **Influence of Oestrogens on Experimental Canine Diabetes Mellitus.**—*Lancet.* **240.** 600–601.

Y. describes experiments carried out to obtain evidence for the theory that the administration of oestrogens, by depressing the activity of the anterior pituitary, would stimulate regeneration of the damaged pancreatic islets in the pituitary-diabetic dog.

Experiments were carried out with four pituitary-diabetic dogs and with one depancreatized dog; the oestrogens used were diethyl-stilboestrol, oestrone, and oestriol. In no case did treatment result in any improvement in the diabetic condition of these dogs. In fact after the administration of oestriol in the one case, there was a significant rise in the D/N quotient.

These results do not confirm those obtained by certain other workers who obtained some alleviation in the diabetic condition of the depancreatized dog and rhesus monkey, but do fall into line with those of Lawrence & Madders (1941), who observed no beneficial results from treatment with diethyl-stilboestrol of five cases of menopausal diabetes in women.

—A. L. Walpole.

POISONS AND POISONING

Schwarzmaier, E. (1941). Glysantin-Vergiftungen bei Hühnern. **[Glysantin Poisoning in Fowls].**—*Tierärztl. Rdsch.* **47.** 125–127.

S. encountered a number of cases of poisoning of fowls by drinking water drained from car radiators; this water contained ethylene glycol used as an anti-freezing agent. Fowls would drink this water readily and death ensued overnight. Experimentally, a dose containing about 7·5 c.c. pure ethylene glycol per kg. body weight proved fatal; smaller doses were without effect or caused only transient illness. Symptoms set in within three hours of dosing, an unsteady gait and drowsiness being followed by convulsions, paralysis, and death. At autopsy there was some congestion of the mucous membrane of the pharynx and oesophagus, a slight mottling of the liver, and swelling of the kidneys. Histologically the kidneys showed congestion of capillaries, local round-cell infiltrations, destruction of glomeruli and degeneration of tubular epithelium. Localized and diffuse round-cell infiltrations were observed in the liver in one case.

Ethylene glycol has been shown to be poisonous for mammals as well as for fowls and greater care is advised in the disposal of radiator water containing this material.—H. E. H.

Poley, W. E., Wilson, W. O., Moxon, A. L., & Taylor, J. B. (1941). **The Effect of Selenized Grains on the Rate of Growth in Chicks.**—*Poult. Sci.* **20.** 171–179.

Experiments are recorded to determine the

level at which selenium-containing grains can safely be fed to breeding hens and growing chicks. Hatchability was not significantly affected by either 2 or 4 p.p.m. of Se in the hen's diet. The growth rate of chicks receiving a ration containing no Se was slower when they were hatched from the eggs of hens receiving 4 p.p.m. than when the chicks were hatched from the eggs of hens receiving 0 or 2 p.p.m. of Se. In five out of six trials, chicks receiving 2 p.p.m. of Se grew slightly faster than those receiving no selenium.

Pullets of 8–24 weeks of age fed a "growing" ration containing 5–8 p.p.m. of Se grew as well as pullets on a ration containing no Se. A "starter" ration containing 10 p.p.m. of Se affected the growth of chicks, whilst 14 p.p.m. caused excessive mortality. It is recommended that "starting" and "growing" rations should contain not more than 5 p.p.m. of Se.

—F. D. ASPLIN.

I. RAGHAVACHARI, T. N. S., & VENKATARAMANAN, K. (1940). **Endemic Fluorosis in South India. The Occurrence of Fluorides in Drinking Water-Supplies with a Note on Attempts at their Removal.**—*Indian J. med. Res.* **28.** 517–532.

II. PANDIT, C. G., RAGHAVACHARI, T. N. S., RAO, D. S., & KRISHNAMURTI, V. (1940). **Endemic Fluorosis in South India. A Study of the Factors Involved in the Production of Mottled Enamel in Children and Severe Bone Manifestations in Adults.**—*Ibid.* 533–558.

III. PANDIT, C. G., & RAO, D. N. **Endemic Fluorosis in South India. Experimental Production of Chronic Fluorine Intoxication in Monkeys** (*Macaca radiata*).—*Ibid.* 559–574.

I. The occurrence of fluorides in excess of 3 p.p.m. in drinking water supplies with resulting mottled enamel in children has been recorded in an extensive area of South India. The severity of the fluoride intoxication was related to the concentration of fluorides in the water which in turn was correlated with the presence of rich fluoride-bearing rocks.

Several methods for the removal of fluorides from water were tried, but no chemical process suitable for use under field conditions has as yet been devised. "Defluorite", a proprietary product containing about 90% alumina, appears to be the most promising.

II. Investigations extending over a period of three years showed that mottled enamel in children was universally present in all the areas where the fluoride content of the water approached or exceeded 1 p.p.m. The severe form of chronic fluorosis affecting bones, ligaments, and joints was restricted to villages where the concentration of fluorides in water was highest (6 p.p.m.). An interesting observation was that a pronounced deficiency of vitamin C in the diet was especially associated with a severe incidence of the disease, provided that the fluoride concentration of the domestic water supplies was high at the same time.

III. Sodium fluoride was administered to monkeys to ascertain the influence, if any, of vitamin C intake in the diet on the production of these symptoms. The absorption and excretion of fluorine in these animals were studied in two animals. It was found that monkeys which did not receive vitamin C in the diet showed greater absorption of fluorine and greater excretion in urine as compared with monkeys which had received a liberal supply of vitamin C. Radiological findings on a larger number of animals show that absence of this vitamin in the diet not only promotes greater absorption, but probably enhances the deposition of fluoride salts in bones as shown by their greater densities, favouring the production of symptoms of chronic fluorine intoxication. Fluorine appeared in the urine and faeces of the animals from the commencement of the experiment. This observation is contrary to that recorded by BRANDL & TAPPEINER.—B. N. MAJUMDAR.

DAAKE. (1940). Bienenstiche bei Pferden. [**Bee Stings in Horses**].—*Dtsch. tierärztl. Wschr.* **48.** 21–24.

References to recorded cases of bee stings in horses are quoted and D. gives a vivid description of the effect of a swarm of bees which attacked four army horses drawing a wagon. The wagon was stopped in a young pine plantation near what proved to be a camouflaged bee hive and horses and men were surrounded by large numbers of bees. Three of the horses rapidly succumbed and only one could be freed from its harness and rescued.

Examination of the fourth animal showed bee stings so thickly placed that they appeared like fine short hairs; 60 were counted in 1 sq. cm. of skin around the eyes. There were general symptoms diagnosed as due to acute

heart failure and the animal died four hours after being stung, in spite of administration of digitalis and cardiazol. Autopsy showed serohaemorrhagic infiltration of the skin and subcutaneous tissues, pulmonary hyperaemia, cardiac dilatation, intravascular haemolysis, and oedema of the glottis.—E. G. WHITE.

WILGUS, H. S., Jr., GASSNER, F. X., PATTON, A. R., & GUSTAVSON, R. G. (1941). **The Goitrogenicity of Soybeans.**—*J. Nutrit.* **22.** 43–52.

It had previously been shown by other workers that soya beans were goitrogenic in rats, while the authors themselves had produced goitre in chickens by feeding a diet containing 25% soya-bean oil meal. These results were confirmed and extended in experiments with inbred White Leghorn chicks and with rats. The "goitrogenic factor" was partially inactivated by heat, and could be counteracted by feeding iodine. In one experiment, birds which received 18,000 μg. of I_2 per kg. ration retained normal thyroids despite the fact that they were receiving 35% of soya beans. Whatever its nature, the "goitrogenic factor" was not extracted by various organic solvents, the residues from such extractions being highly potent.

In one experiment with chicks, a mild goitre developed on a ration containing 14% casein but free from soya bean or its products.

—ALASTAIR N. WORDEN.

SHARPLESS, G. R., & METZGER, M. (1941). **Arsenic and Goiter.**—*J. Nutrit.* **21.** 341–346.

Experiments on rats show that arsenic can act as a positive goitrogenic substance, but when given in non-toxic amounts (0·005% of the diet) it had a slight but insignificant effect. When the concentration of As was 0·02% of the diet, growth was decreased 50%, iodine concentration of the thyroid was decreased, and the thyroid weight was increased; the I_2 requirement of the animal was more than doubled. The results indicate that in areas where the I_2 intake is relatively low and the As intake is sufficient to be slightly toxic,a goitrogenic effect can be expected.—R. ALLCROFT.

FRENCH, M. H., & MILNE, A. H. (1941). **Some Metabolic Disturbances in Domestic Stock Following Injection of 4 : 4′-Diamidino 1 : 5 Diphenoxy-Pentane.**—*Vet. Rec.* **53.** 413–416.

The trypanocidal activity of certain aromatic diamidine compounds is well known [see *V. B.* **11.** 58 and 557]. During tests to assess the trypanocidal value of 4 : 4′-diamidino 1 : 5 diphenoxy-pentane in domestic stock it was decided to investigate the metabolic disturbances caused by injections of the drug. The tests were carried out on the larger farm animals as it is difficult to apply to ruminants results obtained with small laboratory animals.

Early tests with 4 : 4′-diamidino 1 : 5 diphenoxy-pentane (M & B 800) showed that three of five cattle died following five weekly injections of 2 mg. per kg. body weight. Blood examinations of three of these animals indicated that no agonal hypoglycaemia had developed. Subsequently the preparation was tested on sheep and goats. Three sheep received single intravenous doses of 2, 10, and 20 mg. per kg. respectively. Both sheep receiving the larger doses succumbed. Blood examination again revealed no signs of hypoglycaemia, but a significant increase in blood urea and degeneration of kidney cortical tissue was observed. Five goats received 15 mg. per kg. of the drug intravenously. One died immediately and the others were destroyed 2–7 days later. All showed cardiac dilatation and venous congestion of the visceral organs.

It is concluded that M & B 800 in doses of over 10 mg. per kg. may produce lethal shock or cause indefinite illness which is usually fatal in a few days. In all cases kidney damage precedes liver injury. No glycaemic changes occurred.—D. D. OGILVIE.

HINDMARSH, W. L. (1941). **The Toxicity of Wild Passion Vine, *Passiflora alba.* (Link and Otto).**—*Aust. vet. J.* **17.** 142–146.

The toxicity for cattle and sheep of this plant is confirmed. Toxic symptoms were produced in an eight-month-old heifer by the ingestion of 4½ lb. per day for seven days of the whole plant mixed with chaff (total ingested, 31½ lb.). Symptoms were produced in an adult sheep by feeding 2 lb. per day for four days (total 8 lb.), and in another by 1 lb. per day, except for two days, given over a period of 11 days, death resulting after the ingestion of 9 lb.

The symptoms were loss of equilibrium, incoordination of movement, inability to swallow, salivation, impaired vision, excitement, and convulsions. The main lesions found were congestion of the brain, cord, and meninges,

and submeningeal haemorrhages.

The plant is ordinarily distasteful to stock and unlikely to be eaten except in dry seasons.
—H. B. CARTER.

CORKILL, L. (1940). **Cyanogenesis in White Clover (Trifolium repens L.). I. Cyanogenesis in Single Plants.**—*N.Z. J. Sci. Tech.* **22.** 65B–67B.

Improvement in the agronomic type of bred strains of white clover has been accompanied by a rise in the cyanoglucoside content of these strains. Knowledge is desired of the inheritance of the cyanophoric property in view of the possibility that selecting towards these very high-producing HCN types may prove injurious to stock. It was demonstrated that white clover can be classified with regard to cyanophoric properties into four distinct groups :– (a) plants containing the cyanogenetic glucoside and also the appropriate enzyme which hydrolyses this glucoside and produces hydrocyanic acid ; (b) plants which contain the glucoside but not the enzyme ; (c) plants which contain the enzyme but not the glucoside, and (d) plants which contain neither the glucoside nor the appropriate enzyme.—M. B. BUDDLE.

MELVILLE, J., & DOAK, B. W. (1940). **Cyanogenesis in White Clover (Trifolium repens L.). II. Isolation of the Glucosidal Constituents.**—*N.Z. J. Sci. Tech.* **22.** 67B–71B. [Authors' summary copied *verbatim*].

(1) The glucosidal constituent was isolated from white clover in yields as high as 1·5 grams per kilogram fresh material. (2) The cyanogenetic material is a mixture of about 80 per cent. lotaustralin with 20 per cent. of the lower homologue linamarin.

THERAPEUTICS

SPÖRRI, H., & RAGGENBASS, A. (1940). Der Einfluss der Calciumtherapie der Gebärparese auf das Elektrokardiogram. [**The Influence of Calcium Therapy for Milk Fever on the Electrocardiogram**].—*Schweiz. Arch. Tierheilk.* **82.** 325–332.

It is pointed out that in horses, cattle and small ruminants the initial phase of the excitatory condition of the ventricle is the converse of that seen in man, dogs, cats, rabbits, and g. pigs, the principal peak being negative.

In the present work electrocardiograms were recorded in the cow leading off from the following points :– (a) from the right prescapular region and the sacral tubers, (b) from the region of the apex of the heart and the right prescapular region, and (c) from the region of the apex of the heart and the sacral tubers.

The electrocardiogram taken in a cow with milk fever was compared with the normal. The animal had an irregular pulse of 60, was comatose, and there was rattling in the throat. The electrocardiogram showed a greatly prolonged RT-interval and this prolongation was due to an extension of the flat part of the curve lying between the two peaks marking the beginning and end of ventricular systole. Systole was 0·6 sec. with a heart rate of 60, while a normal cow had a heart rate of 51 with a systole of only 0·39 sec. The curve also demonstrated the arhythmic character of the beat, with extra systoles at various stages. Intravenous injection of 400 c.c. of a 10% calcium gluconate solution was followed by an immediate response ; the RT-interval shortened to 0·45 sec. and the beat became normal and rhythmical. This abnormality and its cure could be experimentally reproduced in g. pigs. Following intravenous sodium citrate injection the electrocardiogram showed a greatly increased RT-interval, but this returned to normal on injection of calcium chloride.

In the cow with milk fever, insufflation of the udder was not followed by any improvement in the electrocardiogram.—H. E. HARBOUR.

SCHWOCHOW, K. (1941). "Eigenserum als Blutstillungsmittel." [**Homologous Serum as Haemorrhage Arrestor**].—*Dtsch. tierärztl. Wschr.* **49.** 83–85.

The intravenous administration of fresh horse serum produced a marked decrease in the coagulation time of the blood of horses *in vivo*. A suitable dose of serum was 80 c.c. and this amount caused a reduction of the coagulation time from the normal value of 12–13 min. to 6 min. within half an hour and 2–3 minutes after a period of two hours. This greatly reduced coagulation time persisted for 80 hours and then gradually returned to normal after 5–7 days. Serum used for this purpose should not be more than five days old and the intravenous route is more effective than the intramuscular.

This method of arresting haemorrhage is recommended for the practitioner since it acts rapidly, persists for several days and costs nothing.—E. G. WHITE.

RUSSELL, D. S., & FALCONER, M. A. (1941). **Antiseptics in Brain Wounds. An Experimental Study of the Histological Reaction of Solutions.**—*Brit. J. Surg.* **28.** 472–497.

The histological effects of various antiseptic solutions upon the brain of the rabbit have been investigated. Such solutions should be isotonic and as far as possible buffered to neutrality. Proflavine sulphate (0·1 %) buffered to pH 6·2 is not more injurious to the brain than normal saline; 2 : 7 diamino-acridine hydrochloride is similar to proflavine in its action. Acriflavine and euflavine produced toxic effects. Dettol diluted with distilled water was very toxic, but dettol diluted with saline and buffered, as well as supersan, produced effects similar to saline. The application of halogen antiseptics (azochloramid and eusol) to the brain produced severe necrosis, as did the application of mercurials (metaphen, merthiolate, phenyl mercuric nitrate). Toxic effects were produced by hydrogen peroxide. No appreciable damage to the brain was observed following the application of soluseptasine or of small quantities of sulphanilamide or sulphapyridine powder.—J. M. ROBSON.

TRAUTWEIN, K. (1941). Die Desinfektionswirkung von Jodersatzpräparaten auf pathogene Pilze. [**The Disinfectant Action of Wartime Substitutes for Iodine on Pathogenic Fungi**].—*Z. ImmunForsch.* **100.** 32–57. [Abst. from author's summary].

It is concluded from experiments that tincture of iodine as well as having a higher bactericidal power than certain bromine compounds ("sepsotinktur" and "dibromal"), used as wartime substitutes in Germany, also has a stronger effect on pathogenic fungi.

GILMAN, H. (1941). **Some Biological Applications of Organo-Metallic Compounds.**—*Science.* **93.** 47–50.

Organometallic compounds are compounds which have a metal directly attached to carbon, but only those of low chemical reactivity can, of course, have any immediate biological application. The more important applications are their use in the determination of structure and the synthesis of biologically significant materials like vitamins, hormones, haemoglobin, and chlorophyll, and in the treatment of infections and diseases of both plants and animals. Arsenic, antimony and bismuth compounds have found wide applications in the treatment of a variety of protozoan diseases; As and Bi compounds have also been shown to be effective in the treatment of some forms of coccidiosis. Organogold compounds have been used, with indifferent success, in the treatment of TB. but with greater promise in the treatment of some forms of arthritis [see also *V. B.* **11.** 479]. Recent studies indicate that organolead compounds may be beneficial in the treatment of cancer, and germanium compounds are being examined in studies on pernicious anaemia.

The pronounced effects of very small quantities of metals and their derivatives have given rise to the expression "oligodynamic action", *e.g.*, 1 part of Cu in 100 million parts of distilled water will kill algae. Metals or their salts are widely distributed in plants and animals and the importance of trace elements in nutrition is well known.—R. ALLCROFT.

MARSHALL, E. K., Jr. (1941). **Bacterial Chemotherapy.**—*Ann. Rev. Physiol.* **3.** 643–670.

This review deals with the sulphonamide group of chemotherapeutic substances. Their effectiveness on streptococcal, pneumococcal, and other bacterial infections is discussed; reports indicate that they are also in some degree effective against certain members of the pasteurella group, have some effect on the course of anthrax infections in mice, and on infection with *Haemophilus influenzae*, *Listerella*, *Bacterium coli* and *Bact. flexneri* in mice, and *Fusiform necrophorus* in rabbits. The absorption, excretion and distribution of these drugs is discussed together with the problem of how the sulphonamides affect the bacteria and inhibit their multiplication.—R. ALLCROFT.

STEFFAN. (1940). Zur Therapie des ansteckenden Katarrhs der Luftwege des Pferdes. [**Treatment of Infectious Respiratory Catarrh of Horses**].—*Dtsch. tierärztl. Wschr.* **48.** 642–645.

In early stages a combination of chemotherapy and cardiac stimulants should be used, even if there are no signs of cardiac failure. Eubasin (sulphapyridine) was used,

50–80 g. given intramuscularly followed by 5 g. three times a day given orally until the temperature fell. In the later stages the sulphonamides had no effect, but vetastil (free guaiacol in aqueous solution) was found to be of value. Repeated intravenous administration of cardiac stimulants in 25–30% glucose solution was found to be of particular value. Caffeine and various preparations of the cardiac glucosides were used, and strychnine was also valuable in the acute condition. In some cases cardiazol (3–6 g. per day) was given orally.

—J. M. ROBSON.

MCEWEN, A. D., PIZER, N. H., & PATERSON, J. D. (1941). **Preliminary Trials on the Administration of Sulphonamide E.O.S. and of 4 : 4′-Diaminodiphenylsulphone to Normal Cattle and to Cattle Affected with Streptococcal Mastitis.**—*Vet. Rec.* **53.** 429–436.

Tests on cattle of sulphonamide E.O.S. and 4 : 4′-diaminodiphenylsulphone show that the former is much the more toxic. Sulphonamide E.O.S. in single doses of 180–360 g. or repeated doses of 90 g. *per os* caused serious intestinal irritation with loss of condition and diminution in milk yield. One heifer which received 1,440 g. in 3½ days showed symptoms of nervous derangement. 4 : 4′-diaminodiphenylsulphone was of low toxicity. Therapeutic doses caused no illness. Indefinite nervous symptoms occurred in one heifer which received *per os* 180 g. followed in 12 hours by 90 g.

Neither preparation was satisfactory in the treatment of *Str. agalactiae* infection. In view, however, of the improved clinical condition of the udder which followed administration of 4 : 4′-diaminodiphenylsulphone a more extended trial of this agent is being arranged.

—D. D. OGILVIE.

SCHALM, O. W. (1941). **The Use of Trypaflavin in the Infusion Therapy for Streptococcic Mastitis.**—*Amer. J. vet. Res.* **2.** 117–126.

S. investigated the therapeutic value of trypaflavine, by various methods of infusion, in the treatment of mastitis. A 1 : 4,000 aqueous solution was infused into 29 infected quarters with results which showed that while bacteriological sterilization was effected in most cases the damage caused to the udder tissue was serious. In comparative tests with the two concentrations, it was found that a 1 : 10,000 solution was as effective as the stronger one in removing streptococci but was much less irritating, while the effect on milk production was minimal following a single infusion. By adopting the methods recommended by STECK [*V. B.* **10.** 70.], it was found that trypaflavine in a hypertonic (20%) sugar solution effected recovery in 69% of quarters by a single infusion, in 21·8% by two infusions, and in 1·8% by three infusions; 7·2% were pronounced incurable. It is claimed that by employing a hypertonic sugar solution as a vehicle, it is possible to use a much greater concentration of trypaflavine without damaging the udder tissues, and in this manner the efficiency of treatment is increased. [S. used glucose, but STECK used saccharose.]—S. J. EDWARDS.

STECK, W. (1940). Ueber den Einfluss von grossen Sulfanilamidgaben auf den Verlauf der Druse des erwachsenen Pferdes. **[Influence of Large Doses of Sulphanilmide on the Course of Strangles in Full-Grown Horses].**—*Schweiz. Arch. Tierheilk.* **82.** 343–351.

Satisfactory results have been obtained in the treatment of strangles in adult horses with sulphanilamide, 80 g. of the drug being administered over a period of two days. In many cases the temperatures fell on the second day and the treatment was again interrupted. In some cases a second course was given. It is important that the animals should rest during the period of treatment and for at least three days after the return of the temperature to normal.—J. M. ROBSON.

BIETER, R. N., BAKER, A. B., BEATON, J. G., SHAFFER, J. M., SEERY, T. M., & ORR, B. A. (1941). **Nervous Injury Produced by Sulfanilamide and some of its Derivatives in the Chicken : Preliminary Report.**—*J. Amer. med. Ass.* **116.** 2231–2236. [Extract from authors' summary copied *verbatim*].

The order of the drugs in the sulfanilamide series studied according to the amount of injury they produce in the nervous system of the chicken, beginning with the least injurious, is sulfanilamide, sulfapyridine, sulfathiazole, sulfamethylthiazole, sulfanilyl dimethyl-sulfanilamide and sulfaphenylthiazole.

Under certain conditions unknown at present, and after repeated doses, some cumulation of

at least four of these drugs tends to occur in the sciatic nerve.

I. LANDY, M., & WYENO, J. (1941). **Neutralization (*in vitro*) of Bacteriostatic Activity of Sulfonamides by P-Aminobenzoic Acid.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 59–62.

II. MCCARTY, M. (1941). **Effect of P-Aminobenzoic Acid on Therapeutic and Toxic Action of Sulfapyridine.**—*Ibid.* 133–136.

III. STRAUSS, E., DINGLE, J. H., & FINLAND, M. (1941). **Use of Para-Aminobenzoic Acid to Inhibit Sulfonamide Action in Bactericidal Tests.**—*Ibid.* 131–133.

I. The *in vitro* bacteriostatic effect of sulphanilamide, sulphapyridine, and sulphathiazole on streptococci, pneumococci, and staphylococci respectively was neutralized by *p*-aminobenzoic acid; the amount of growth was, in general, proportional to the concentration of the *p*-aminobenzoic acid. These results are in agreement with those of WOODS and of FILDES [*V. B.* **10.** 790, and **11.** 129]. The *o* and *m* isomers of *p*-aminobenzoic acid exhibited no anti-sulphanilamide effect, thus demonstrating the specificity of the *p* compound in sulphonamide neutralization.

II. The curative effect of sulphapyridine given to mice infected intraperitoneally with type I pneumococci was nullified by subcutaneous administration of *p*-aminobenzoic acid [see also *V. B.* **11.** 128]. In toxicity experiments, no untoward symptoms were caused by *p*-aminobenzoic acid but it had no effect on the immediate fatal toxicity for mice of sulphapyridine injected subcutaneously.

III. Bactericidal tests on fresh defibrinated blood, using stock strains of pneumococci, showed that the action of sulphathiazole was completely inhibited by *p*-aminobenzoic acid but that the action of the pneumococcal antibodies was unaffected by it.—R. ALLCROFT.

GLÄTTLI, H. (1941). Therapeutische Versuch mit Merfen speziell beim Rind. **[Therapeutic Trials with Merfen Especially in Cattle].**—*Schweiz. Arch. Tierheilk.* **83.** 241–253.

Merfen (phenyl mercuric borate) is a relatively non-toxic, highly active antiseptic; it is a white odourless powder easily adsorbed. Solutions in water, etc. and suspensions with charcoal are stable. Though the cow is very susceptible to mercurials, large quantities of a merfen charcoal suspension (20 ml.) can be injected intravenously without producing any toxic effects. Preliminary results suggest that the repeated intravenous administration of the drug may be of value in the treatment of contagious abortion as well as in other conditions.—J. M. ROBSON.

DANCKWORTT, P. W. (1941). Die Prüfung von Derris-Präparaten auf Wirksamkeit. **[The Testing of Derris Preparations for Potency].**—*Dtsch. tierärztl. Wschr.* **49.** 318–319.

Various chemical methods were investigated for the determination of the active principles of derris preparations. The active principles (rotenone especially) have a marked optical activity and the measurement of the specific rotation produced by suitable preparations gave satisfactory results. A biological method on goldfish was tried, but was found to be both expensive and unreliable.—J. M. ROBSON.

KAUZAL, G. P. (1941). **A Note on the Failure of Phenothiazine as an Anthelmintic against *Strongyloides papillosus* of Sheep.**—*J. Coun. sci. industr. Res. Aust.* **14.** 218–219.

Phenothiazine in a dose of 0·6 g. per kg. body weight administered to lambs 4–5 months old had no effect on *S. papillosus* and egg production was unaffected. There was no further development of eggs in cultures of faeces passed during the two days following administration.—H. MCL. GORDON.

EDER, N. J. (1941). **A New Treatment for Internal Parasites of Sheep.**—*Vet. Med.* **36.** 272.

Each of 17 lambs, heavily parasitized by *Haemonchus contortus* and *Oesophagostomum columbianum*, was given one "ributyl" capsule containing 3 c.c. *n*-butyl chloride and 0·25 grain phenolphthalein. No irritation or straining was observed and it is stated that six days after dosing the lambs were free from worms. Twenty-two sheep, heavily infested with *H. contortus*, were given one "ributyl" capsule each every two weeks for two months, with beneficial results. The capsules were well tolerated and there was no colouring of the urine. E. believes further studies on the efficacy of the drug are worth while in view of some of the disadvantages of phenothiazine.

—J. N. OLDHAM.

PUBLIC HEALTH

LORENZEN, P. (1940). Die amtliche Milchuntersuchung im Veterinäruntersuchungsamt. [**Official Milk Inspection in the Veterinary Investigation Office (Kassel)**].—*Dtsch. tierärztl. Wschr.* **48.** 469–474.

A description of the first two years' (1937–38) work of laboratory examination of milk samples, carried out according to a plan by which one annual milk test must be performed per 1,000 inhabitants. In practice this meant that tests had to be carried out continuously during the year on milk from the various districts.

In the two-year period, 2,296 bulk milk samples were examined for quality and for freedom from pathogenic bacteria. 5·8% contained brucella, 1·08% tubercle bacilli, and 1·8% showed evidence of streptococcal mastitis. These infections were more common in herds of over ten cows than in smaller ones, which were almost entirely free. For this reason, L. suggests that it is sufficient to examine one sample per year of the mixed milk from ten small herds, so that the time may be used profitably on samples from the larger herds individually.

Many technical points are discussed, both with reference to the official regulations and to scientific technique. Milk samples were collected in 150 c.c. bottles to which 1 g. boracic acid was added as a preservative. This, while necessary, stultifies the official alcohol and boiling test for freshness. The sample is not large enough to use in the prescribed filter test for dirt: instead dirt was looked for in the centrifuge sediment. For tests of heating the Schern-Gorli test is recommended in addition to the official peroxidase test. The official test for " microscopically demonstrable pus " in the diagnosis of mastitis also proved difficult, as pus may be present in the absence of mastitis streptococci and *vice versa*. The prescribed injection dose of 2 c.c. of cream + sediment is too big for g. pigs: two separate injections of 1 c.c. are recommended instead. L. found that a milk serum titre of 1 : 40 or over is a sure indication of udder infection by brucella.

Many more points are also discussed.—J. E.

TECHNIQUE AND APPARATUS

DAVENPORT, H. A., & KLINE, C. L. (1938). **Staining Paraffin Sections with Protargol. I. Experiments with Bodian's Method. II. Use of N-Propyl and N-Butyl Alcohol in Hofker's Fixative.** —*Stain Tech.* **13.** 147–160. [Abst. from authors' abst.]

DAVENPORT, H. A., MCARTHUR, J., & BRUESCH, S. R. (1939). **Staining Paraffin Sections with Protargol. III. The Optimum pH for Reduction. IV. A Two-Hour Staining Method.**—*Ibid.* **14.** 21–26. [Abst. from authors' abst.]

I & II. Paraffin sections of nervous tissue, which had been fixed in a modification of Hofker's fluid, stained readily with protargol solution without the addition of metallic copper or other activator. Amidol-sulphite mixtures reduced the protargol more rapidly and completely than hydroquinone sulphite. The method works well on spinal nerve roots, cerebrum, cerebellum, and spinal cord, and moderately well on nerve trunks including sympathetic nerves. Tissues from cat and g. pig were used.

III & IV. Further work on conditions affecting the reduction of paraffin sections impregnated with protargol showed that the optimum pH for sulphite-amidol mixtures was 6·5–7·5. A staining method which requires about two hours to complete consists of the following steps:– (1) one hour's impregnation at 60°C. in 10% $AgNO_3$, wash in distilled water, three changes of 30 sec. each; (2) 0·2% aqueous protargol for one hour at room temperature, rinse 2 sec.; (3) reduce for 1–2 min. in a mixture of 0·2 g. amidol, 8 g. Na_2SO_3, 1 g. $NaHSO_3$, and 100 ml. water, wash thoroughly; (4) tone with 0·1% gold chloride, wash, and (5) reduce with a 0·5% aq. soln. of amidol (no sulphite), wash, dehydrate, and cover. The method stains neurofibrillae and unmyelinated fibres and has worked well on most tissues of vertebrates.

BANK, E. W., & DAVENPORT, H. A. (1940). **Staining Paraffin Sections with Protargol. 5. Chloral Hydrate Mixtures, with and without Formamide, for Fixing Peripheral Nerves.**—*Stain Tech.* **15.** 9–14. [For previous parts, see preceding abst.]

A 10% solution of formamide in 50% ethyl

alcohol gave good fixation of peripheral nerves for staining by the silver method, using protargol. The addition of 5–7% of chloral hydrate to the mixture improved staining.

—E. G. White.

Piekarski, G., & Ruska, H. (1939). Uebermikroskopische Darstellung von Bakteriengeisseln. [**Supermicroscopical (Electron Microscope) Demonstration of Bacterial Flagellae**].—*Klin. Wschr.* **18.** 383–386.

Using the electron microscope it is possible to demonstrate the presence of bacterial flagellae in unstained preparations dried on collodion films. A number of photographs show the flagellae of *Proteus vulgaris*, *Salmonella paratyphi* B, *Pseudomonas pyocyanea*, and *Chromobacterium prodigiosum*. In some of these, details of the structure of the bacterial cell can also be seen.

The electron microscope photographs show that the number and length of the flagellae are greater than previous methods have indicated.

—R. A. Kekwick.

I. Field, J. W. (1940). **A Simple and Rapid Method of Staining Malarial Parasites in Thick Blood Smears.**—*Trans. R. Soc. trop. Med. Hyg.* **34.** 195–202.

II. Field, J. W. (1941). **Further Notes on a Method of Staining Malarial Parasites in Thick Blood Films.**—*Ibid.* **35.** 35–42.

I. Certain basic stains in aqueous solution can penetrate a depth of 50μ of dried blood with great rapidity, at the same time being adsorbed by leucocytes and blood protozoa before lysis of the red cells is complete and before the red-cell envelopes are so deeply stained that the microscopic field is obscured. If the staining process is arrested when contrast is greatest, it is found that the leucocytes and protozoa are contrasted against a pale yellow background of residual haemoglobin. The essential conditions for the satisfactory use of this method are (1) the use of certain basic stains in isotonic solutions to conserve the outlines of leucocytes (the best stain appears to be brilliant cresyl blue), (2) the staining reduced to 1 sec., (3) the buffering of the stain to pH 6·6–7·0 which gives maximum contrast, and (4) retention of some of the haemoglobin to provide a yellow background as contrast to the stained parasites. The method is exceedingly quick and tests have shown it to be fairly accurate.

II. Although the above method proved reliable for diagnosis there were disadvantages associated with the weak affinity of the single stain for chromatin, the chromatic dots of *falciparum* "ring" stages being but poorly defined. When films were exposed to isotonic solutions of year-old methylene blue for 1 sec. and to isotonic eosin for a further second the dots were stained a deep purple-red. This true Romanowsky effect was undoubtedly due to the formation of methylene azure on ripening of the methylene blue. This was confirmed by using freshly made solutions and comparing the results with those obtained when small quantities of azure I were added.

As a routine technique, the thick blood films are dipped into jars of methylene-blue azure and eosin in isotonic solutions with quick rinses of water in between. Apart from the advantages of a rapid procedure there is a trichromatic effect with sharp contrasts between parasites and the ground of laked red cells; the method has been found superior to the standard methods of Giemsa staining, in that less damage is done to the leucocytes and blood protozoa.—C. Horton Smith.

Gershenfeld, L., & Tice, L. F. (1941). **Gelatin for Bacteriological Use.**—*J. Bact.* **41.** 645–652.

Gelatins from various animal sources undergo physical and chemical changes when they are autoclaved in the course of production of nutrient gelatin.

Nutrient gelatin in concentrations of 10, 15, and 20% was prepared from nine gelatin samples derived from bone (both alkali and HCl treated) and pork skin. Each sample was sterilized in batches at 15 lb. pressure for 30, 60, and 90 min. Samples which solidified after cooling were inoculated separately with three species of bacteria which liquefy gelatin and one species which does not liquefy gelatin. A sample of pork skin gelatin with a high Bloom rating (jelly strength of gelatin) fulfilled all the experimental requirements, *viz*, solidification at room temperature, liquefaction by certain species of bacteria and at 37°C., and the ability to withstand without change autoclaving at 15 lb. pressure for 20–30 min.—E. C. Hulse.

Cantor, A. (1941). **The Maintenance of Aerobic, Micro-Aerophilic and Anaerobic Conditions in a Petri Dish.**—*J. Bact.* **41.** 155–170.

C. describes a new method for the isolation

of aerobic, micro-aerophilic and anaerobic organisms in a petri dish. A thin, flat, glass plate (80 mm. x 1 mm.) is mounted on three small pieces of glass (1 mm. thick). 1 ml. of a suspension of the specimen to be examined is pipetted into the dish and 20 ml. of melted heart-infusion agar added (45°–47°C.); the contents of the dish are mixed by rotation. The sterile glass plate is then carefully slipped into the agar; a layer of agar 1 mm. thick is formed below the plate. If micro-aerophilic organisms are present they will grow round the circumference of the plate at the junction of the superficial (aerobic) and deep (anaerobic) layers; the anaerobic organisms grow readily in the deep layer.

The aerobic organisms growing on the upper surface of the agar are readily removed with the glass plate prior to the examination of the lower layer. Different species of anaerobes and micro-aerophiles were isolated from fresh faeces, vaginal swabs, urine, and gum scrapings by this technique. An adequate supply of CO_2 in the culture medium was obtained by the addition of sodium bicarbonate to the medium before autoclaving; the medium was put up in stoppered glass bottles for this purpose.

—E. C. Hulse.

Tubb, J. A., & Proctor, A. (1941). **A Convenient Accessory for the Rapid Microscopic Examination of Dry-Mount Objects.**—*J. Coun. sci. industr. Res. Aust.* **14.** 220.

This simple contrivance consists of two brass plates, each with a glass plate cemented in as a central window. The brass plates lie one on top of the other and are hinged together at one end.—W. I. B. Beveridge.

Otto, G. F., Hewitt, R., & Strahan, D. E. (1941). **A Simplified Zinc Sulfate Levitation Method of Fecal Examination for Protozoan Cysts and Hookworm Eggs.**—*Amer. J. Hyg.* Sect. D. **33.** 32–37.

Impressed with the amount of time, effort, and equipment required by the zinc sulphate levitation method devised by Faust *et al.* [*V. B.* **10.** 394.] for concentrating protozoan cysts and helminth eggs in faeces, the authors have experimented with a simplified technique. Human faecal specimens one week to one month or more old, stored in a refrigerator at 2°–6°C., were used; the results of different techniques are tabulated as (a) number of specimens positive and (b) number of organisms per ten fields. The original zinc sulphate levitation-centrifugation method, using zinc sulphate solution of sp. gr. 1·18, was found to be the most efficient. The Willis brine levitation technique was the most efficient for concentrating hookworm ova, but it did not reveal any protozoal infections. A simple levitation technique without straining, washing, or centrifugation, essentially as described by Willis but using zinc sulphate solution, was just as efficient as the original method for concentrating hookworm eggs and nearly as efficient in concentrating protozoan cysts. The simplified method is neither time- nor labour-consuming and requires inexpensive apparatus. It is, however, useless for revealing protozoan trophozoites; examination of direct smears to find these organisms is essential.—J. N. Oldham.

I. Whitlock, J. H. (1941). **A Practical Dilution-Egg-Count Procedure.**—*J. Amer. vet. med. Ass.* **98.** 466–469.

II. Blount, W. P. (1941). **Observations on the Modified Gordon-Whitlock Method for the Counting of Helminth Ova in Horse Faeces.**—*J. R. Army vet. Cps.* **12.** 69–78.

I. The Stoll dilution egg-counting technique requires both experience and time and the modification of this technique by Gordon & Whitlock [*V. B.* **10.** 217.] utilizes an accurately calibrated glass chamber, the cost of which is high, and a 2 g. faecal sample which must be carefully weighed and may be subject, in herbivores especially, to a large sampling error. W. therefore suggests a further modification as follows. Weigh out 10 g. of faeces and convert into a thick puree-like suspension with water. Add water to make 150 ml., and stir vigorously. Strain about 10 ml. of the suspension into a small beaker and from this draw exactly 0·5 ml. into a graduated tuberculin syringe. Next draw into the syringe exactly 0·5 ml. of a saturated sugar or saline solution and then an air bubble of such diameter as to agitate considerably the contents of the syringe when it is tilted. After thoroughly mixing in this manner and after expelling about 0·2 ml. as waste, expel three 0·15 ml. samples into a special glass counting chamber, agitating the syringe before each sample. The counting chamber is made by fixing a narrow strip of glass, broken from another slide, at each end

of an ordinary slide, and fixing upon these two supports another slide; the two slides should be set a little askew. After the expulsion of the three samples into this chamber, it is placed on the microscope stage and left undisturbed for at least 1 min. to allow the helminth eggs to float to the surface. The total number of eggs in each sample is then counted and the average number computed: this multiplied by 200 gives the number of eggs per gramme of faeces. The equipment needed for this technique is inexpensive and W. claims that reasonable care and alertness are the only essentials to its successful use.

II. After describing the Gordon-Whitlock egg-counting technique, B. discusses the variations in counts and how they may arise. He considers the main fault of the technique to be the small size of the counting chamber, and details the construction of suitable larger chambers. His modification of the Gordon-Whitlock method is to prepare 150 ml. of aqueous faecal filtrate from 20 g. of mixed faeces; to a 20–30 ml. sample of this is added an equal quantity of saturated salt solution and approximately 1 ml. of this liquid is examined microscopically. The number of eggs per gramme of faeces is calculated as follows:– the number of eggs counted is multiplied by the dilution, this result being divided by the amount, in ml., of fluid examined.

To preserve and prevent the hatching of eggs during postal transit the addition of dry phenothiazine or 20% "mefarol" to the faeces has been found superior to packing the droppings tightly in closed containers.—J. N. OLDHAM.

MISCELLANEOUS

—. (1940). **Baroda Veterinary Officers' Association. Proceedings of the Civil Veterinary Conference held at Baroda on the 11th, 12th and 13th September, 1940.**—*Indian vet. J.* **17.** 167–176.

This conference was the first of its kind in the State. The development of the veterinary department was reviewed, and some of the important contagious diseases of animals in the State were discussed.—M. K. SREENIVASAN.

DE ANDRADE, A. S. (1938). Notas históricas de interêsse pecuário. [**The History of Animal Husbandry in Portugal**].—*Bol. pec., Lisboa.* **6.** 81–272. [French summary].

The first chapter deals briefly with the importance attached to animal husbandry in the earliest civilizations, and gives some statistical data regarding domestic animals in the five continents from 1864–1934. In the second chapter, the author gives a historical review of animal husbandry and industry in Portugal since the foundation of the monarchy, and describes the development and activities of the veterinary services. The next chapter deals with veterinary education in Portugal, and the last with veterinary and agricultural legislation since 1211 A.D.

SCHMALTZ. (1939). Die Neuregelung der tierärztlichen Ausbildung. [**Reorganization of Veterinary Education in Germany**].—*Berl. Münch. tierärztl. Wschr.* June 9th. 369–371.

This is a commentary on a change in veterinary education in Germany by which, from 1939, the previous curriculum of nine semesters requiring a total attendance of about 4½ years was altered to be completed in eight semesters (four years). It does not appear that any of the instruction is abandoned by this change, but merely that the students have somewhat less time to assimilate it. S. advocates that some subjects should be removed from the course and taught only as extra subjects for students destined for special types of veterinary work. —J. E.

VAN WIJK, A. M., & PATTERSON, H. S. (1940). **The Percentage of Particles of Different Sizes Removed from Dust-Laden Air by Breathing.**—*J. industr. Hyg.* **22.** 31–35. [Authors' summary copied *verbatim*].

1. An apparatus has been devised, using two thermal precipitators, for measuring the percentage number of siliceous dust particles of different size ranges removed from dust-laden air by breathing.

2. It has been found that about 25% of particles of size 0·2 μ and about 80% of size 2 μ are removed. Between those two sizes the percentage removal is nearly proportional to the square root of the size.

3. Above a size of about 3 μ the percentage removal increases slowly until at a size of 5 μ about 95% of the particles are removed.

4. It has not proved possible to explain the

square root relationship found between size and percentage removal, theoretically, but the calculated displacements due to a combination of sedimentation and Brownian motion appear to be quite adequate to account for the removal of the particles.

5. It appears likely that the larger particles will tend to be deposited in the larger air passages and with decrease of size there will be a tendency for the particles to be deposited in smaller air passages. Owing to the subsequent expulsion of particles from the larger air passages by physiological mechanisms, the size distribution of the dust in the inhaled air may be some guide to the size distribution of the dust ultimately retained by the lungs.

OFFICIAL AND OTHER REPORTS

CANADA. (1940). **Report of the Veterinary Director General, for the Year ended March 31, 1940.** [CAMERON, A. E.] pp. 45. Ottawa: Govt. printer. [8vo].

The Veterinary Director General reviews the operations of the departments, the details of which are given in the reports of the main sections [see following absts.]. Dr. M. BARKER was appointed Chief Veterinary Inspector in 1939.

The importation of certain commodities is prohibited from countries affected with foot and mouth disease.

War conditions affected the trade in pork. Owing to the difference in the price of pork products in Canada and the U.S.A., there were large importations of pork from that country, and this was accentuated by increase of exports of pork products from Canada to Great Britain. As a result SWINE FEVER gave more trouble than usual. Most of the outbreaks originated on "garbage-feeding" premises; the existing regulations concerning the cooking of garbage are well observed on the whole, but increased attention had to be given to inspection of premises that use this pig food.

Details are given of the regulations governing the importation of members of the parrot family, made to control outbreaks of psittacosis.

CANADA. (1940). [**Report of**] **Contagious Diseases Section [1939-40].** [BARKER, M.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1939–1940.* pp. 8–32.

The country continues to be free from the more serious diseases of livestock. There was one small outbreak of ANTHRAX in the Province of Quebec. Substantial progress has been made in TUBERCULOSIS eradication and control. 1,674,891 tuberculin tests were carried out under the Area, the Accredited Herd, and the Supervised Herd plans. Approximately 40% of all cattle in Canada are supervised and have been tested. There are 1½ million cattle in accredited areas where the infection is 0·5% or less. An account is given of the work on the control of BOVINE CONTAGIOUS ABORTION; 2,134 herds are under supervision, of which 1,027 are free from the disease. There have been no cases of GLANDERS. The first cases of RABIES since 1938 occurred during the year. One case was in a dog brought from the U.S.A. In another instance an outbreak involved nine dogs, a cat, and three cattle. Quarantine restrictions were removed before the end of the year. There was a recrudescence of SWINE FEVER during the year which is attributed to the feeding of pigs with scraps of imported pork from the U.S.A. There were 33 outbreaks in which 7,990 pigs were slaughtered. Statistical tables give the areas and the numbers of tuberculin tests since the eradication plans were commenced. In cattle there were a few outbreaks of chorioptic, sarcoptic, and psoroptic MANGE. Only one case of equine psoroptic mange was found. No case of SHEEP SCAB has occurred during the past 12 years.—J. A. G.

CANADA. (1940). [**Report of**] **Meat and Canned Foods Section [1939-40].** [MACONACHIE, C.]—*Rep. vet. Dir. gen. Dep. Agric. Can. 1939–40.* pp. 33–45.

There was a large increase in the output of all meat products. Nearly 30% more swine were slaughtered. The exports of meat products amounted to a total of 318,870,808 lb., an increase on 1938–39 of 109,389,507 lb. Eighty-eight establishments were operating under the Meat and Canned Foods Act. 298 meat-inspection employees were engaged in full-time employment. Animals slaughtered were 879,137 cattle, 668,835 calves, 786,219 sheep, 3,961,882 swine, and 817,138 poultry, and also some bison, elk, moose, deer, and goats.

Carcass condemnations of cattle amounted to 1·69%, and 65·16% of these were due to emaciation (mucoid degeneration) or TUBERCULOSIS. 0·86% of the calves were condemned

as "immature". Swine condemnations were 0·22% of those slaughtered and 35·72% of the carcasses and 72·35% of all portions condemned had TUBERCULOSIS. Cattle slaughtered were bulls 5%, steers 32%, cows 36%, and heifers 26%. Only 3,594 cattle were exported to Great Britain as shipments ceased on the outbreak of war.—J. A. GRIFFITHS.

INDIA. (1940). **Imperial Council of Agricultural Research. Proceedings of the Third Meeting of the Animal Husbandry Wing of the Board of Agriculture and Animal Husbandry in India, Held at New Delhi from the 20th to the 23rd February 1939.** pp. ii + 307. Numerous appendixes. Simla: Govt. India Press. [8vo] [Rs. 3–2–0].

After a report on progress made as a result of the 1936 Wing Meeting, papers upon 19 different subjects were read and discussed. Of these, the following are of veterinary interest.

ACHAR gave a review of JOHNE'S DISEASE in India and suggested that a systematic study of its incidence and spread should be undertaken simultaneously in several provinces. Methods for its control were discussed. Diagnostic tests were stated to be somewhat unreliable. The conference recommended that the disposal of positive reactors should form the subject of future discussions as the slaughter of such animals is impracticable in India.

WALKER summarized the present position regarding the control of SURRA in horses and cattle in the Punjab, stating that the disease can be cured by naganol alone and by the naganol + tartar emetic method, provided cases are treated early. He stressed the need for further research into the prophylactic properties of naganol and for determining and eradicating the transmitting agents. The conference recommended that the investigation of bovine surra should be included as an item of special importance in the future programme of work for the veterinary investigation officers in India and stated the need for exploring the possibility of using drugs less expensive than naganol.

RAY described the present position in regard to THEILERIASIS of cattle in India and suggested that there may be a plurality of strains of theileria parasites in the country. An antiserum to be used for treatment was being studied. The conference recommended further investigations into this disease, with special reference to its possible relationship to EAST COAST FEVER and its control by drugs of the sulphanilamide group.

HADDOW stated the necessity for a more intensive study of RINDERPEST in sheep and goats before the susceptibility of these animals and the incidence of the disease among them could be properly estimated or effective control be undertaken. He suggested that difficulties of diagnosis may account for the few reports of this infection and that the possibility that rinderpest might be a factor in outbreaks of so-called pneumonia or pleuro-pneumonia should always be considered. The conference recommended that investigations should be actively continued.

MALIK outlined the various attempts made in India and elsewhere to prepare a satisfactory serum or vaccine for NEWCASTLE DISEASE but concluded that, except for hygienic measures, no method of control has yet been evolved. MACDONALD stated that stamping out by slaughter of the affected birds with rigid segregation of, and prevention of infection through, imported birds was the best method at that time.

SEN stated that an inquiry into the life-history and bionomics of the warble fly had been in progress at the Imperial Veterinary Research Institute for the past two years. A regional survey had shown that the ox warble-fly is widespread in comparatively dry and in arid areas and more rare in moister localities. The seasonal prevalence of this pest has been shown to vary with local conditions and altitude. It differs from the goat warble-fly in its regional distribution, seasonal prevalence, and length of time of infestation. The conference considered that investigations had reached the stage when measures for the control of the fly by the application of lime-tobacco dressings might be usefully adopted in selected areas. It also recommended that a scheme should be drawn up of research into the question of the damage caused to hides by ticks in India.

SHIRLAW, in reviewing and discussing the aetiology of GOAT PNEUMONIA in India, pointed out that, in most cases, parasitic invasion of the lungs plays a predominating part in the evolution of the syndrome, and he suggested that the key to the problem may lie in the control of verminous infection. The conference expressed the need for further investigation, especially into the possible relationship of this disease with HAEMORRHAGIC SEPTICAEMIA of cattle.

HURLEY drew attention to the effects of cattle migration between provinces and states on the control of contagious diseases and the breeding of pure-bred stock. As complete prohibition of movement by legislation is not practicable, the only feasible plan appeared to be to restrict movement in the case of certain diseases, certain recognized routes being open only to immunized animals. He described an experiment on these lines being carried out in selected areas in Madras Presidency with regard to RINDERPEST. As regards breeding pure-bred stock, he advocated a policy of keeping those areas, in which this work is being attempted, more or less self-contained in the matter of livestock and preventing, as far as possible, the migration of cattle into them.

KEHAR, in dealing with the implications of hay making, stressed the importance to animal health of maintaining the nutritional properties, particularly the carotene content, of conserved fodder. He described experiments to determine the factors involved in the destruction of carotene and to find a practical method suitable to Indian conditions for conserving fodder plants so that their original nutritional properties are not affected.

LANDER indicated the correlation between soil deficiencies, poor cultivation, unthrifty cattle, and human malnutrition, with particular reference to deficiency diseases in the Kangra Valley. MUKERJEE advocated an analytical survey of the soil, fodder, grasses, and crops of different localities as a means of tackling the problem of animal and human malnutrition. NARAYANA IYER described analytical work carried out in Travancore, indicating that a marked deficiency of calcium and phosphorus in the soil and fodder was responsible for the poor condition of cattle in that part of India.

—L. H. SHIRLAW.

U.S.A. (1939). **Report of the Chief of the Bureau of Animal Industry, 1939.** [MOHLER, J. R.] pp. 82. Washington, D.C.: Supt. of Documents. [8vo] [10 cents].

The Bureau concentrated on its major activities, the suppression of TUBERCULOSIS and TICK FEVER, and control of BRUCELLOSIS in addition to research and general routine functions in controlling disease.

ANIMAL DISEASE STATION [CRAWFORD, A. B.] —In work on BRUCELLOSIS in cattle and sheep, field trials of calfhood vaccination were continued and studies made of the role of other animals in maintaining infection in some cattle herds. All antigen used in tests at state laboratories is produced at this station. 10,000 calves had been vaccinated since 1936. Observations so far show that heifers treated had increased resistance in the first and second pregnancies and also possibly in the third. In tests of 1,557 sheep-blood samples, 1,542 were negative, and agglutination only occurred in titres of 1 : 25 (10), 1 : 50 (4), and 1 : 100 (1). Studies were made on tuberculin sensitization in non-tuberculous " skin-lesion reactors " and also on the tuberculin sensitization which occurred in a herd kept on a marshy pasture for six months. In the treatment of MASTITIS, sulphonamide was only beneficial while being administered, streptococci reappearing when dosing ceased. Some new " species " of streptococci were found causing mastitis. Studies on VESICULAR STOMATITIS, which clinically resembles FOOT AND MOUTH DISEASE, were continued. The virus can be successfully cultivated on 11-day-old chick embryos (maximum growth in 40–48 hours). Experiments on production of a chick-embryo vaccine are being made. Work on LEUCOSIS (FOWL PARALYSIS) and AVIAN ENCEPHALOMYELITIS (EPIDEMIC TREMOR) is discussed.

ANIMAL HUSBANDRY AND ANIMAL NUTRITION DIVISIONS [MCPHEE, H. C., and HOWE, P. E.] —The experimental work carried out by these divisions is recorded. These include investigations on livestock improvement, meat, beef and dual-purpose cattle, sheep, goat and animal fibre, swine, horses and mules, and poultry. A summary of a decade of study on SWINE FEVER immunization of sucking pigs shows the advantages of the method. Over 10,000 sucking pigs were given serum-virus inoculation.

BIOCHEMIC DIVISION [CHAPIN, R. M.]—Experiments were continued to demonstrate the efficacy of phosphated crystal-violet vaccine against SWINE FEVER. Work on disinfectants, meat food products, and tuberculin is also reviewed.

FIELD INSPECTION DIVISION [FLADNESS, S. O.]—Details of the work of the division are given. SHEEP SCAB control includes inspection and dipping of nearly 15 million sheep.

INTERSTATE INSPECTION DIVISION [MILLER, A. W.] — Bureau inspectors examined 18,542,168 cattle and 23,147,679 sheep.

MEAT INSPECTION DIVISION [JOSS, E. C.]—

The vast scope of the work of this division is covered largely by tables. 646 establishments in 242 towns were under supervision.

PATHOLOGICAL DIVISION [SCHOENING, H. W.]—186,662 cases of EQUINE ENCEPHALOMYELITIS occurred in 39 states. Mortality was 21·4%. Mortality from the Eastern type virus was 90·2% in the few infected cases. In the Western type infections mortality was 19·8%. Field investigations on PERIODIC OPHTHALMIA in a selected area were undertaken. Studies on INFECTIOUS ANAEMIA of equines, SWINE ERYSIPELAS, ANAPLASMOSIS and other diseases are detailed, and also work on plants poisonous to stock.

DIVISION OF TICK ERADICATION AND SPECIAL DISEASE [MACKELLAR, W. M.]—There are 226 veterinarians and also other Bureau employees on this work, in addition to state employees. 970 counties in 15 states are declared tick free. Thirty of the staff deal with SWINE FEVER control.

TUBERCULOSIS ERADICATION DIVISION [WIGHT, A. E.]—Altogether the state, territorial and counties staffs numbered 462 veterinarians. 11,186,805 tuberculin tests were made. At the end of the year 60,439,030 cattle were being supervised for eradication of TB. Over 7½ million cattle were tested for BRUCELLOSIS and 2·9% reacted.

DIVISION OF VIRUS-SERUM CONTROL [SKIDMORE, D. I.]—The production of certain biological products marketed is under the control of the division. The work in connexion with SWINE FEVER virus and serum, EQUINE ENCEPHALOMYELITIS vaccine and serum, *Brucella abortus* vaccine and SWINE ERYSIPELAS serum is described.

ZOOLOGICAL DIVISION [SCHWARTZ, B.]—Studies on *Trichomonas foetus* infection of ruminants were continued. A single infection may give partial or complete immunity. There is some evidence to show that a partial immunity is obtained by the inoculation of defibrinated blood from an immune animal. COCCIDIOSIS of calves due to *Eimeria zürnii* and *E. auburnensis* is described. Experiments were made with drugs and chemicals to discover practical measures of destroying eggs and larvae of PARASITES in manure and of removing parasites from livestock and poultry. The addition to manure of urea destroys strongyle eggs by the formation of ammonium hydroxide in the course of its decomposition. Research on the common liver fluke and its snail intermediate hosts was initiated in Utah. Four potential intermediate hosts were found (*Fossaria modicella*, *F. parva*, *Stagnicola caperata*, and *S. proxima*) and two additional snails were found to serve as intermediate hosts (*Lymnaea stagnalis wasatchensis* and *F. modicella rustica*). Three of five lambs became infected after being fed with cysticercoids of *Moniezia expansa* from oribatid mites, and the eggs of the tapeworm appeared 40 days later in the faeces. Lead arsenate alone and tin oleate with synthetic isopelletierine hydrochloride were 100% efficient in the treatment of *Raillietina cesticillus* infestation in chickens. Commercial phenothiazine was found to be an efficient anthelminthic in the treatment of pigs and sheep, for nodular worms, ascarids, and stomach worms in particular, in doses of 0·5 g. per lb. body weight. Gapeworms in poultry were successfully treated by inhalation of barium antimonyl tartrate in the form of a dust. Average efficiency was found to be 92% in chicks and 96% in turkey poults. A box 29″ × 28″ × 18″ was used to treat 50 one-month-old chicks at a time.—J. A. GRIFFITHS.

U.S.A. (1940). **Report of the Division of Veterinary Science, Michigan State College of Agriculture and Applied Science, East Lansing, for the year ended June 30, 1940.** [GILTNER, W.] pp. 78. East Lansing: Michigan State College. [8vo].

Details are given of the educational side of the division's activities; the routine work of the departments of anatomy, animal pathology, bacteriology and hygiene, and surgery and medicine are covered by the reports of the respective heads.

REPORT OF THE EXTENSION SPECIALIST IN ANIMAL PATHOLOGY [KILLHAM, B. J.]—Disease control measures in Michigan state are described. In the 65 months up to November 1939 there were 1,473,516 tests of bovine blood for BRUCELLOSIS and 4·3% reacted. Much propaganda work is carried on among farmers to encourage application of voluntary control measures. 70,000 of the 384,000 horses in the state were treated for horse parasites. Among other diseases mentioned are EQUINE ENCEPHALOMYELITIS (110 cases) and bovine MASTITIS. Milk samples examined showed 28·3% positive and 8·3% suspicious for streptococcal infection.

REPORT OF THE EXTENSION SPECIALIST IN POULTRY PATHOLOGY [WEISNER, E. S.]—The scope of the work is detailed. The main dis-

eases are INFECTIOUS NEUROLYMPHOMATOSIS, intestinal HELMINTHIASIS, PULLORUM DISEASE, acute TOXAEMIA (COLIBACILLOSIS) and DEFICIENCY DISEASES.

REPORT OF EXPERIMENTAL WORK.—(1) *Studies in brucella infections* [HUDDLESON, I. F.]. This has been abstracted separately [*V. B.* **12.** 75].

(2) *Mastitis of cattle* [BRYAN, C. S.]. Details are given of the various tests used in diagnosis, the results of investigations on which have already been published. Treatment with sulphanilamide has only proved effective while the drug is being administered.

(3) *Poultry diseases and public health bacteriology* [STAFSETH, H. J.]. RYFF has worked on acute TOXAEMIA and COLIBACILLOSIS in chickens, SALMONELLA INFECTION in poultry in relation to FOWL PARALYSIS, PSEUDOMONAS INFECTION in turkeys, and *Vibrio foetus* infection in ewes. General research on PULLORUM DISEASE diagnostic methods was also carried out. The autopsy work shows an increase in the incidence of pullorum disease. 5,374 autopsies of poultry were made.

EXPERIMENT STATION WORK IN ANIMAL PATHOLOGY AND HYGIENE [VETERINARY DIVISION].—This is a reprint from the biennial report of the Michigan Agricultural Experiment Station for 1938–40 and will be abstracted separately.

AGRICULTURAL DIVISION, SECTIONS ON ANIMAL AND DAIRY HUSBANDRY.—Work done on NECROTIC ENTERITIS in swine indicated that it is primarily due to a nutritional deficiency. Feeding of liver, yeast, or nicotinic acid gives remarkable results as a preventive or a cure [see DAVIS *et al.*—*V. B.* **11.** 316].

Chemical studies of KETOSIS in dairy cows show that the cause is a dietary deficiency involving loss of condition and a decrease in milk production, as well as ill effects on milk flavour [see DUNCAN *et al.*—*V. B.* **11.** 547].

DUNCAN, LIGHTFOOT, and HUFFMAN found that the bovine plasma Mg is less after the change from winter to summer conditions. No connexion with environmental factors was found and solar radiation does not appear to affect the change. Low Mg values occur in the months when there is more than eight hours of sunshine a day and when mean and maximum temperatures exceed 55°F. and 70°F. respectively.

It has been found [see MOORE—*V. B.* **11.** 123.] that there is a relation between carotene and NIGHT BLINDNESS in calves due to the constriction of the optic nerve where it passes through the bony optic canal, this being due to the low level of carotene in the blood plasma and in the ration. Calves between 1–3 months of age fed on a diet low in carotene developed night blindness in 48–73 days. When blood plasma carotene fell below 0·13 μg. per mg., night blindness and papillary oedema followed. Papillary oedema, a sign of increased intracranial pressure, and nyctalopia were also shown to be due to vitamin A deficiency, though the former is usually associated with the blindness while the latter is not.—J. A. G.

BOOK REVIEW

HARVEY, W. C. [M.D., D.P.H., M.R.San.I., Medical Officer of Health, Borough of Southgate], & HILL, H. [M.R.San.I., A.M.I.S.E., M.S.I.A., Sanitary Inspector, Borough of Southgate]. (1940). **Insect Pests.** pp. ix+292. 23 figs., 3 appendixes. London: H. K. Lewis & Co. Ltd. [8vo] [10s. 6d.]

The authors of this work have summarized the essential information required by authorities responsible for the control of household insect pests, particularly those that attack man. The book is of interest chiefly to medical officials, but the chapters dealing with fumigation and disinfestation of foodstuffs are of interest to veterinarians. On the whole the subject matter is well prepared, but certain parts of the chemical section require revision. Thus, on page 143, formaldehyde, methyl salicylate, and essential oils are classified as phenols, and on page 144 it is stated that no elements which are basically poisonous are involved in the composition of Lethane 384. While the latter statement is true, it should be pointed out that certain combinations of carbon and nitrogen with other elements form compounds of varying toxicity, and in this case the active agent is a poisonous compound. In dealing with pyrethrum, the recommended concentrations of pyrethrins, namely, 0·3% on page 143 and 0·8% on page 247 would make the cost of these sprays prohibitive. The chapters on fumigation form a very useful guide for operators having to undertake this essential work which, if not properly carried out, may prove disastrous to all concerned.—W. MOORE.

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No. 2.—Issued June.	Indexing period previous July—December.

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